STEVENS · CRESTO ENGINEERING, INC.

DRAINAGE STUDY

FOR:

OTAY BUSINESS PARK, TM 5505R

(ADDENDUM TO THE APPROVED STUDY FOR OTAY BUSINESS PARK, TM 5505, DATED MAY 4, 2010)

OTAY MESA, CA

Prepared for:
OTAY BUSINESS PARK, LLC.
4370 La Jolla Village Drive, Suite 640
San Diego, CA 92122

Prepared by:
STEVENS CRESTO ENGINEERING INC.
9665 Chesapeake Drive, Suite 200
San Diego, CA 92123

DATE: 01/31/14
SCE Project: 12009.02

Env. Log No. PDS2014-ER-9319006WW
Proj. No. PDS2014-GPA-14-004; PDS2014-SPA14-002; PDS2014-TM5505R

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SECTION 1

PURPOSE OF ADDENDUM

This drainage study has been prepared as an addendum to the approved Drainage Study for: Otay Business Park, TM 5505, dated May 4, 2010. This addendum addresses proposed changes to the project, which are shown on TM 5505R, and include the following: a revised lot and street layout, moving the open drainage channel west, away from the easterly project boundary, and creating a large rough graded pad for future use by the anticipated Point of Entry to the east.

Generally, the proposed TM 5505-R conforms to the findings and conclusions presented in the approved drainage study for TM 5505. The project will honor pre-project watershed basins and discharge points, and will provide peak flow mitigation so run-off flow rates leaving the project site do not exceed pre-project flow rates. The project will utilize two detention ponds, one in the southwest corner of the project and one in the southeast corner, to collect lot runoff and release it a controlled rate. Detention routing calculations have been updated for the proposed layout and are provided in Section 3. A combination of private and public storm drain systems will collect lot runoff for conveyance to the appropriate detention facility. As proposed with TM 5505, off-site run-on will be routed around or though the project and will not comingle with project runoff prior to discharge from the detention facilities.

Additionally, Otay Business Park is a Priority Development Project and, as such, is subject to the hydromodification mitigation requirements detailed in the San Diego Countywide Hydromodification Plan, dated March 25, 2011, and required per the Regional Water Quality Control Board Order No. R9-2007-0001, Provision D.1.g (6). The detention facilities proposed at Otay Business Park will be designed to satisfy hydromodification detention requirements, in addition to peak flow detention requirements. Hydromodification calculations are provided within the project SWMP. The two proposed detention facilities will provide adequate hydromodification mitigation for all proposed roads and industrial lots at ultimate buildout. These calculations assume 80% imperviousness for the lots; if any lot proposes impervious surface exceeding 80%, additional hydromodification mitigation will likely be required on-lot. Additionally, water quality measures, such as bioretention, will need to be incorporated on-lot to mitigate for anticipated pollutants generated. All future developments will be subject to a Site Plan review process and will need to provide adequate water quality documentation and calculations as is appropriate at the time of processing.

CONCLUSION

Calculations within this addendum demonstrate that the proposed TM 5505R generally conforms to the findings and calculations presented in the approved Drainage Study for: Otay Business Park, TM 5505, dated May 4, 2010. The project utilizes two detention facilities to provide hydromodification and peak flow mitigation; runoff generated by the project will not exceed pre-project peak flow rates. The following table summarizes pre-project and post-project runoff calculations:

	Pre-Project Condition[1]			Post-Project Condition		
	Drainage	Area	Q_{100}	Area	Q_{100} (cfs)	
Basin	Node	(acres)	(cfs)	(acres)	Undetained	Detained
A (West)	140	309.2	226.4	317.1	474.7	226.4
B (East)	230	694.1	507.7	713.8	669.2	507.7

[1]Taken from the Drainage Study for: Otay Business Park, TM 5505, dated May 4, 2010, see Section 5 for excerpts from study.

Addendum to Drainage Study for :
Otay Business Park, TM 5505, Otay Mesa, CA

DECLARATION OF RESPONSIBLE CHARGE

I hereby declare that I am the Engineer of Work for this project, that I have exercised responsible charge over the design of the project as defined in Section 6703 of the Business and Professions Code, and that the design is consistent with current standards.

I understand that the check of project drawings and specifications by the County of San Diego is confined to a review only and does not relieve me, as Engineer of Work, of my responsibilities for project design.

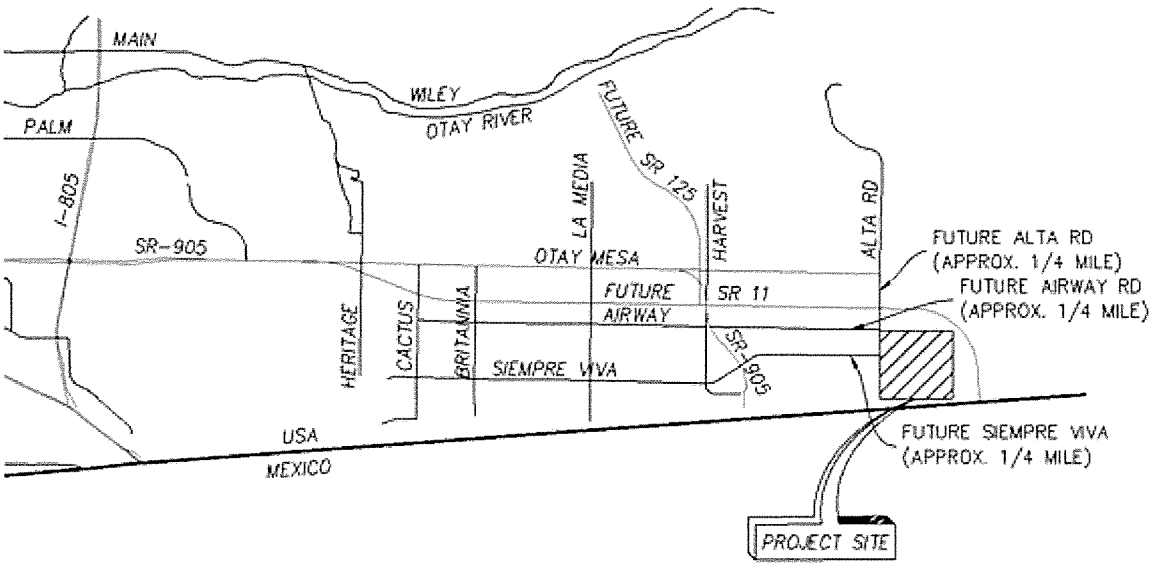
_____ _____

Mark E. Stevens
R.C.E. 35502

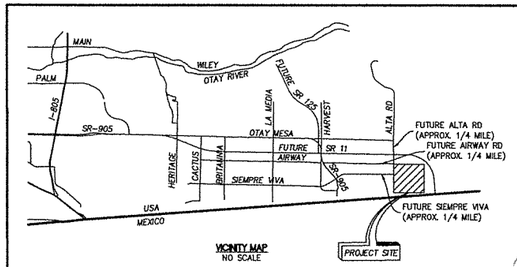
Date

SECTION 2

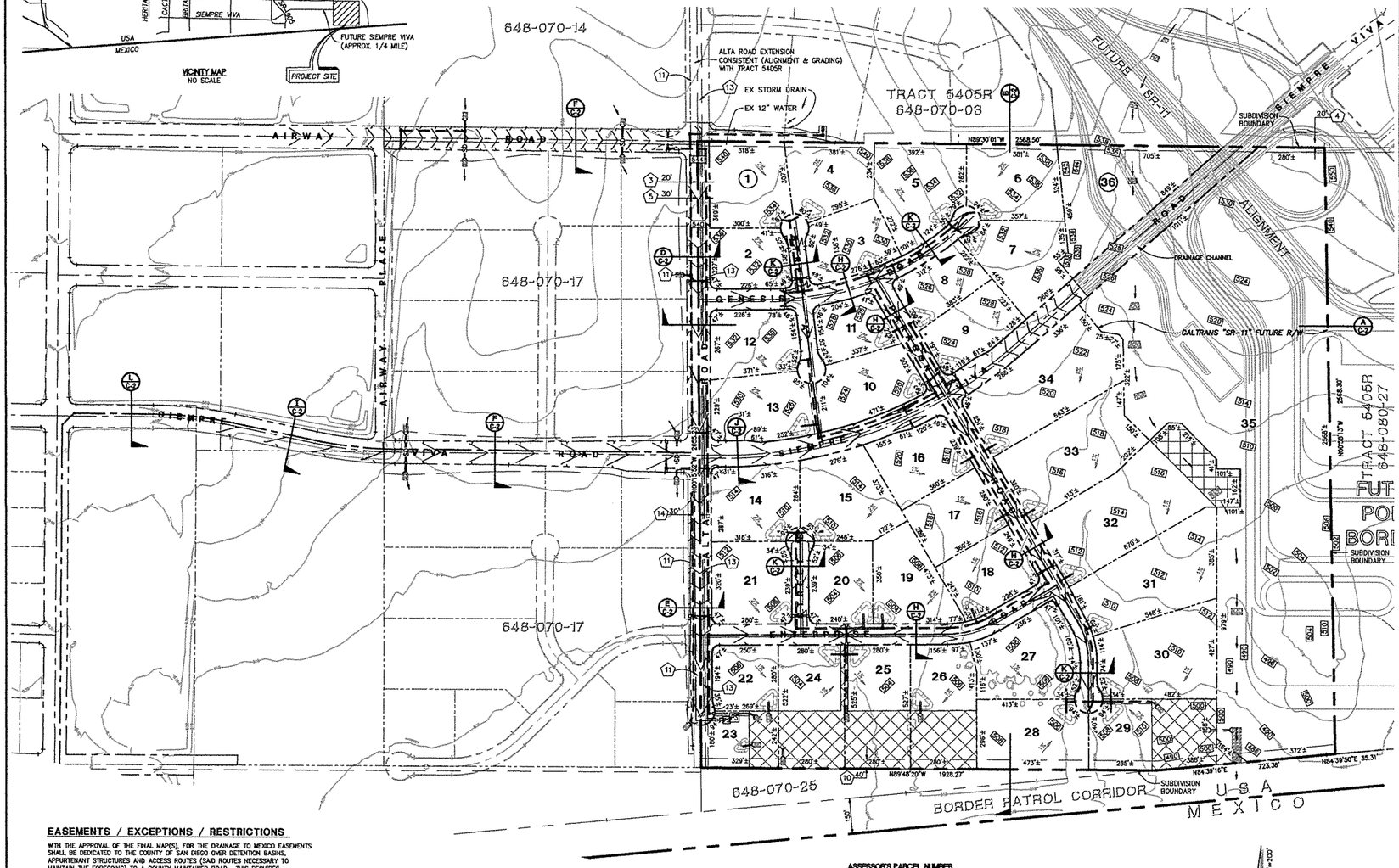
VICINITY MAP
No Scale



COUNTY OF SAN DIEGO TRACT 5505R
TENTATIVE MAP
OTAY BUSINESS PARK



VICINITY MAP
NO SCALE



LOT AREAS	
NO.	ACREAGE
1	2.79
2	1.96
3	2.25
4	2.43
5	3.36
6	2.88
7	2.84
8	1.86
9	2.14
10	2.59
11	1.72
12	2.39
13	2.75
14	2.73
15	3.14
16	2.39
17	2.31
18	2.29
19	2.61
20	2.14
21	2.70
22	1.79
23	1.76
24	3.36
25	3.38
26	3.37
27	3.34
28	3.17
29	3.78
30	4.06
31	4.35
32	6.39
33	4.29
34	5.07
35	36.41
36	4.68
TOTAL AREA	141.4± AC.
ON SITE ROAD AREA	20.2± AC.
TOTAL PROJECT AREA	161.60± AC.

LEGEND

DESCRIPTION	SYMBOL
PROPOSED LOT NUMBER	(1)
SUBDIVISION BOUNDARY	
INTERNATIONAL BORDER	
EXISTING CONTOUR	330
PROPOSED LOT LINE	
PROPOSED RIGHT-OF-WAY	
PROPOSED RIGHT-OF-WAY SR-11	
PRIVATE EASEMENT	
SETBACK	
FUTURE RIGHT-OF-WAY	
EXISTING WATER LINE	
PROPOSED SEWER LINE	
PROPOSED WATER LINE	
PROPOSED STORM DRAIN	SD SD
PROPOSED EASEMENT	
PROPOSED WING-TYPE HEADWALL	
PROPOSED CATCH BASIN	
RIP RAP	
PROPOSED FORCE MAIN	
PROPOSED PUMP STATION	PS
SLOPE RATIO	2:1 MAX FILL 1.5:1 MAX CUT
PROPOSED CONTOUR	500
DAYLIGHT LINE	
FLOWAGE	

SHEET INDEX

AREA TABLE:

GROSS ACREAGE WITHIN SUBDIVISION BOUNDARY:	161.60± ACRES
PROPOSED CALTRANS RIGHT-OF-WAY (LOTS 35 & 36)*:	41.09± ACRES
PROPOSED ON-SITE PUBLIC ROADWAYS*:	20.15± ACRES
PROPOSED ON-SITE DETENTION BASINS "A" & "B" + CHANNEL "C":	9.09± ACRES
TOTAL DEVELOPABLE NET AREA (LOTS 1 THRU 34)**:	91.28± ACRES

*AREA OF PROPOSED SIEMPRE VIVA ROAD WITHIN PROPOSED CALTRANS R.O.W. = 2.04± ACRES
**AREA OF LOT 23 (RESERVED FOR PROPOSED SEWER PUMP STATION) = 1.76± ACRES

GENERAL NOTES

1. AREA BREAKDOWN (SEE AREA TABLE ABOVE)
2. TOTAL NUMBER OF LOTS: 36 COMMERCIAL/INDUSTRIAL LOTS INCLUDING; 2 ON-SITE DETENTION BASINS, 1 DRAINAGE CHANNEL EASEMENT AND 1 ON-SITE PUMP STATION LOT. MINIMUM INDUSTRIAL LOT SIZE: 1.72± ACRES
3. EXISTING ZONING – S-88
4. PROPOSED ZONING – S-88
5. GENERAL PLAN REGIONAL CATEGORY: VILLAGE
6. GENERAL PLAN LAND USE DESIGNATION: SPECIFIC PLAN AREA
7. COMMUNITY PLAN OR SUBREGIONAL PLAN: OTAY MESA SUBREGIONAL PLAN, EAST OTAY MESA SPECIFIC PLAN
8. SPECIAL ASSESSMENT ACT PROCEEDINGS – MAY BE REQUESTED FOR THIS PROJECT.
9. PARK LAND DEDICATION NOT REQUIRED IN AN INDUSTRIAL ZONE.
10. STREET LIGHTS WILL BE INSTALLED TO COMPLY WITH THE REQUIREMENTS SPECIFIED BY THE COUNTY STANDARDS.
11. ALL LOTS WITHIN THIS SUBDIVISION HAVE A MINIMUM OF 100 SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING/COMMERCIAL/INDUSTRIAL UNIT ALLOWED BY THIS SUBDIVISION.
12. SOURCE OF TOPOGRAPHY: PREPARED BY PHOTO GEODETIC CORPORATION. DATE OF PHOTOGRAPHY: OCTOBER 15, 2009
13. DISTRICTS / UTILITY SERVICE PROVIDERS:
    SEWER – SAN DIEGO COUNTY SANITATION DISTRICT
    WATER – OTAY WATER DISTRICT
    GAS & ELECTRIC – SDG&E
    TELEPHONE – AT&T
    FIRE – SAN DIEGO RURAL FIRE PROTECTION DISTRICT
    STREET LIGHTING – COUNTY OF SAN DIEGO
14. ALL PROPOSED UTILITIES TO BE UNDERGROUND EXCEPT WATER TREATMENT SWALES.
15. ALL ONSITE STREETS WILL BE PUBLIC.
16. IMPROVEMENTS, EASEMENTS AND DEDICATIONS WILL COMPLY WITH THE REQUIREMENTS SPECIFIED IN THE COUNTY STANDARDS.
17. ALL EXISTING EASEMENTS NOT REMAINING IN USE SHALL BE VACATED PRIOR TO RECORDATION OF THE FINAL MAP(S) SUBJECT TO THE SATISFACTION THE DIRECTOR OF PUBLIC WORKS.
18. STORM DRAIN DETENTIONS SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EAST OTAY MESA SPECIFIC PLAN. THIS DETENTION WILL BE ACCOMPLISHED THROUGH UTILIZATION OF 2 DETENTION BASINS TO SERVE THE OVERALL PROJECT.
19. LAMBERT COORDINATES: 138-1785
20. THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.
21. THIS PROJECT IS A MULTI-UNIT SUBDIVISION. MULTIPLE FINAL MAPS MAY BE FILED PURSUANT TO SECTION 66456.1 OF THE SUBDIVISION MAP ACT
22. PRIOR TO THE APPROVAL OF ANY SITE PLAN FOR ANY DEVELOPMENT PROPOSAL WITHIN THE NOISE PROTECTION EASEMENT, THE APPLICANT SHALL:

    M-N-2: THE PERMIT COMPLIANCE ENGINEER SHALL ENSURE THAT ON-SITE GRADING OPERATIONS DO NOT OCCUR WITHIN 225 FEET OF ANY PROPERTY LINE THAT ABUTS PROPERTIES WHERE ACTIVE GRADING ACTIVITIES ARE OCCURRING. ON-SITE GRADING ACTIVITIES ADJACENT TO THE PROPERTY LINE MAY OCCUR IF GRADING ACTIVITIES FOR ADJACENT PROPERTIES ARE OCCURRING AT A MINIMUM DISTANCE OF 225 FEET FROM THE SHARED PROPERTY LINE. THE PERMIT COMPLIANCE ENGINEER (AS DEFINED IN SECTION 87.420 OF THE COUNTY GRADING ORDINANCE) SHALL DEMONSTRATE COMPLIANCE WITH THIS REQUIREMENT IN THE REGULAR REPORTS REQUIRED PURSUANT TO SECTION 87.420(A) OF THE COUNTY'S GRADING ORDINANCE. THE REGULAR REPORTS SHALL IDENTIFY ANY DAYS WHERE GRADING ACTIVITIES WERE RESTRICTED ON-SITE OR ON ADJACENT PROPERTIES IN ORDER TO ENSURE A MINIMUM DISTANCE OF 225 FEET BETWEEN GRADING ACTIVITIES.

EASEMENTS / EXCEPTIONS / RESTRICTIONS

WITH THE APPROVAL OF THE FINAL MAP(S), FOR THE DRAINAGE TO MEXICO EASEMENTS SHALL BE DEDICATED TO THE COUNTY OF SAN DIEGO OVER DETENTION BASINS, APPURTENANT STRUCTURES AND ACCESS ROUTES (SAID ROUTES NECESSARY TO MAINTAIN THE FOREGOING) TO A COUNTY MAINTAINED ROAD. THIS REQUIRES HYDROLOGIC AND HYDRAULIC REPORTS TO ENSURE APPROPRIATE PRIVATE STORMWATER DETENTION FACILITIES SUCH THAT PEAK STORMWATER FLOWS FROM THE ENTIRE SITE REMAIN THE SAME AS BEFORE THE PROJECT WAS DEVELOPED. ALL OF THE FOREGOING SHALL BE TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.

SEE PRELIMINARY TITLE REPORT BY STEWART TITLE OF CALIFORNIA, INC., ORDER NO. 01-0251783, DATED NOVEMBER 7 2005. ITEMS LISTED BELOW ARE SHOWN IN THE PRELIMINARY TITLE REPORT WHICH EFFECTS ASSESSOR'S PARCEL NO 648-070-21. PLOTTABLE ITEMS ARE DENOTED THUS: X WITH LOCATIONS KEYED THE SAME HEREON.

(3) AN EASEMENT TO OTAY MUNICIPAL WATER DISTRICT FOR THE CONSTRUCTION AND MAINTENANCE OF PIPELINES, RECORDED JUNE 5, 1968 AS FILE NO. 93912, OF OFFICIAL RECORDS.

(4) AN EASEMENT TO OTAY MUNICIPAL WATER DISTRICT FOR THE CONSTRUCTION AND MAINTENANCE OF PIPELINES, RECORDED JANUARY 6, 1970 AS FILE NO. 2033, OF OFFICIAL RECORDS.

(5) AN EASEMENT TO OTAY MUNICIPAL WATER DISTRICT FOR THE CONSTRUCTION AND MAINTENANCE OF PIPELINES, RECORDED FEBRUARY 26, 1974 AS FILE NO. 74-051081, OF OFFICIAL RECORDS.

(9) THE EFFECT OF A DOCUMENT OF JOINT USE BETWEEN SAN DIEGO GAS & ELECTRIC AND OTAY WATER DISTRICT, RECORDED JANUARY 11, 1999, AS FILE NO. 1999-0036773, OF OFFICIAL RECORDS, UNPLOTTABLE.

(10) 40' EASEMENT TO SAN DIEGO GAS & ELECTRIC FOR PUBLIC UTILITIES, RECORDED MARCH 24, 1999, AS FILE NO. 1999-0191043, OF OFFICIAL RECORDS.

(11) EXISTING 24" ACP TIJUANA WATER MAIN PER O.M.W.D. DWG. 16-3-7

(12) EXISTING 12" WATER MAIN PER O.M.W.D. DWG. 16-7-7

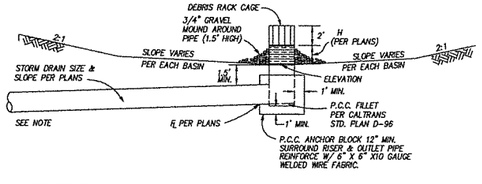
(13) EXISTING 16" WATER MAIN PER O.M.W.D. DWG. 16-7-7

(14) 30' EGRESS/INGRESS IN BENEFIT OF SUBJECT PROPERTY (SEE LEGAL DESCRIPTION, PARCEL 2)

(15) A 20' SEWER ACCESS AND MAINTENANCE EASEMENT TO COUNTY OF SAN DIEGO.

(16) DESIGNATED BIOLOGICAL OPEN SPACE SHALL COMPLY WITH COVENANTS AND RESTRICTIONS IDENTIFIED IN THE OTAY BUSINESS PARK EIR AND BIOLOGICAL REPORT.

(17) UNITED BUILDING ZONE. ALL LOTS AFFECTED SHALL COMPLY WITH BUILDING RESTRICTIONS AS IDENTIFIED IN THE OTAY BUSINESS BUSINESS PARK ENVIRONMENTAL IMPACT REPORT AND FIRE PROTECTION PLAN.



NOTE: TRENCH BACKFILL SHALL CONSIST OF NATIVE MATERIALS, APPROVED BY THE SOILS ENGINEER PRIOR TO PLACEMENT. OPEN-GRADED, HIGHLY PERMEABLE MATERIAL SHALL NOT BE USED AS BACKFILL.

CMP RISER, HOT-DIPPED GALVANIZED 12-GAUGE, 2-2/3 INCH X 1/2 INCH CORRUGATIONS. DIAMETER PER PLANS. CUT FIVE HORIZONTAL SLOTS OF 1/4 INCH X 10 INCHES (EQUALLY SPACED AROUND CIRCUMFERENCE). FIRST ROW TO BE 4 INCHES BELOW UNIVERSAL BAND COUPLER. SECOND ROW TO BE STAGGERED AT 5-1/3 INCHES BELOW FIRST ROW. CONTINUE STAGGERED ROWS UNTIL 24 INCHES ABOVE SOFFET OF PRIVATE STORM DRAIN PIPE.

MAINTENANCE
SEDIMENT SHALL BE REMOVED WHENEVER STORAGE CAPACITY (AT DEPTH 'H') HAS BEEN ACHIEVED. SEDIMENT SHALL BE DISPOSED OF IN SUCH A MANNER THAT WILL PREVENT ITS RETURN TO THE DESILTING BASIN OR MOVEMENT INTO DOWNSTREAM AREAS DURING SUBSEQUENT RUNOFF. THE DESILTING BASINS ARE PRIVATE FACILITIES, AND THE COUNTY WILL NOT BE RESPONSIBLE FOR THEIR MAINTENANCE.

PVT. TEMPORARY EROSION CONTROL DESILTING BASIN
NO SCALE

ASSESSOR'S PARCEL NUMBER
648-070-21

TAX RATE AREA
84035

GRADING QUANTITIES

GRADED AREA:	161.60± ACRES
CUT QUANTITIES:	1,135,000 CYD
FILL QUANTITIES:	1,135,000 CYD
IMPORT/EXPORT:	0 CYD

EXISTING SLOPE ANALYSIS TABLE	
0-15% SLOPES	158.83± AC.
15-25% SLOPES	1.32± AC.
25-50% SLOPES	1.27± AC.
50% OR GREATER SLOPES	0.18± AC.
TOTAL	161.60± AC.

NOTE: GRADING QUANTITIES ARE ESTIMATED FOR PERMIT PURPOSES ONLY AND ARE NOT INTENDED TO BE USED AS FINAL PAY QUANTITIES.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE NAD 83, ZONE 6 GRID BEARING BETWEEN CITY OF SAN DIEGO CONTROL MONUMENTS 1494 AND 1496 AS SHOWN ON RECORD OF SURVEY 14492 BEARING: NORTH 44°35'23" WEST

LEGAL DESCRIPTION
PARCEL 1:

THE SOUTHEAST QUARTER OF SECTION 31, TOWNSHIP 18 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTION THEREFROM THAT PORTION CONVEYED TO UNITED STATES OF AMERICA, IMMIGRATION AND NATURALIZATION SEVICE BE DEED RECORDED APRIL 7, 2000, AS FILE NO. 2000-0177412, OFFICIAL RECORDS.

PARCEL 2:

AN EASEMENT FOR INGRESS AND EGRESS OVER THE EASTERLY 30 FEET OF THE WEST ONE-HALF OF SECTION 31, TOWNSHIP 18 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

SCALE: 1"=200'

0 100 200 400 600
SCALE: 1"=200'

ZONING APN 648-070-21

ZONE	
USE REGULATIONS	S88
ANIMAL REGULATIONS	--
DEVELOPMENT REGULATIONS: DENSITY	--
LOT SIZE	30,000
BUILDING TYPE	W
MAX. FLOOR AREA	--
FLOOR AREA RATIO	0.40
HEIGHT	R
LOT COVERAGE	0.40
SETBACK	V
OPEN SPACE	--
SPECIAL AREA REGULATIONS	B, P or C

OWNER/SUBDIVIDER

OTAY BUSINESS PARK
4370 LA JOLLA VILLAGE DRIVE, SUITE 640
SAN DIEGO, CA 92122
PHONE: 858-535-9047
FAX: 858-535-9100

BY: _____
RICARDO JINICH DATE:

ENGINEER OF WORK

MARK E. STEVENS
R.C.E. 35502 DATE

REGISTERED PROFESSIONAL ENGINEER MARK E. STEVENS No. 35502 Exp. 9-30-15 CIVIL STATE OF CALIFORNIA

REVISIONS	BY

STEVENS · CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · PLANNERS · LAND SURVEYORS
9665 CHESAPEAKE DRIVE
SUITE 200
SAN DIEGO, CA 92123-1352
PHONE: 858.694.5660
FAX: 858.694.5661
www.scengr.com

REGISTERED PROFESSIONAL ENGINEER MARK E. STEVENS No. 35502 Exp. 9-30-15 CIVIL STATE OF CALIFORNIA

TENTATIVE MAP

SAN DIEGO
OTAY BUSINESS PARK
COUNTY OF SAN DIEGO, CALIFORNIA

Date:	FEBRUARY 2014
Scale:	AS SHOWN
Drawn:	SCE
Job:	12009.02
Sheet	C-1
	1 of 10 Sheets

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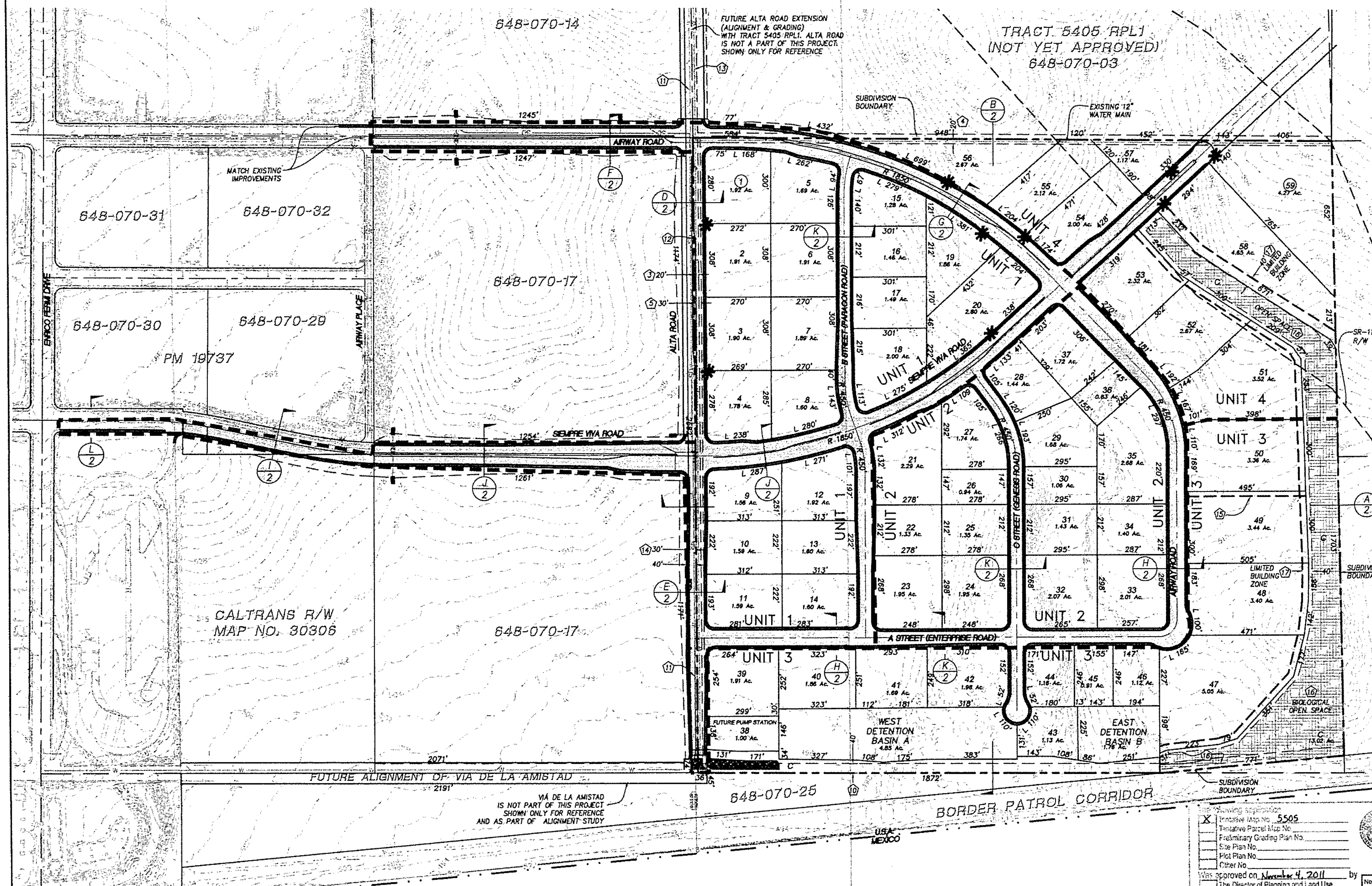
COUNTY OF SAN DIEGO TRACT 5505
REPLACEMENT TENTATIVE MAP
OTAY BUSINESS PARK



LOT AREAS	
NO.	NET ACREAGE
1	1.92
2	1.91
3	1.90
4	1.78
5	1.69
6	1.91
7	1.89
8	1.60
9	1.56
10	1.59
11	1.59
12	1.92
13	1.60
14	1.60
15	1.28
16	1.46
17	1.49
18	2.00
19	1.86
20	2.80
21	2.29
22	1.33
23	1.95
24	1.95
25	1.35
26	0.94
27	1.74
28	1.44
29	1.68
30	1.06
31	1.43
32	2.07
33	2.01
34	1.40
35	2.68
36	0.83
37	1.72
38	1.00
39	1.91
40	1.86
41	1.69
42	1.98
43	1.13
44	1.16
45	0.91
46	1.12
47	5.05
48	3.40
49	3.44
50	3.36
51	3.52
52	2.67
53	2.32
54	2.00
55	2.12
56	2.67
57	1.17
58	4.65
59	4.27
LOT AREA	116.62 AC.
A	4.85
B	1.76
C	13.02
ANCILLARY AREA	19.63 AC.
ON SITE ROAD AREA	25.35 AC.
TOTAL PROJECT AREA	161.6 ±AC.

LOT / UNIT TABLE	
LOTS 1–20	UNIT NO. 1
LOTS 21–37	UNIT NO. 2
LOTS 38–50	UNIT NO. 3
LOTS 51–59	UNIT NO. 4

LEGEND

DESCRIPTION	SYMBOL
PROPOSED LOT NUMBER	1
SUBDIVISION BOUNDARY	
INTERNATIONAL BORDER	
EXISTING CONTOUR	330
PROPOSED LOT LINE	
PROPOSED RIGHT-OF-WAY	
PROPOSED RIGHT-OF-WAY SR-11	
EXISTING WATER LINE	W
PROPOSED SEWER LINE	S
PROPOSED WATER LINE	W
PROPOSED RECLAIMED WATER LINE	R
PROPOSED STORM DRAIN	SD SD
PROPOSED STORM DRAIN SIZE	XX SD
PROPOSED EASEMENT	
PROPOSED WING-TYPE HEADWALL	
PROPOSED CATCH BASIN	
PROPOSED FORCE MAIN	FM FM
PROPOSED PUMP STATION	PS
SLOPE RATIO	2:1 MAX FILL 1.5:1 MAX CUT
PROPOSED STREET LIGHT	
PHASING LINE	
PROPOSED CONTOUR	330
RIP RAP	
DAYLIGHT LINE	
DESILT BASINS	
VEGETATED SWALE (PRIVATELY MAINTAINED)	
ACCESS DRIVEWAY EXCEPTIONS (APPROXIMATE LOCATIONS)	*
BIOLOGICAL OPEN SPACE (SEE NOTE THIS SHEET)	

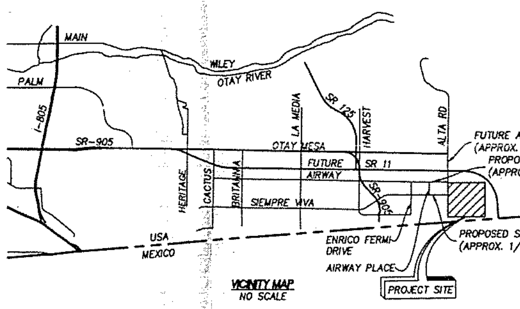
SHEET INDEX

GENERAL NOTES:

1. GROSS ACREAGE WITHIN SUBDIVISION BOUNDARY: 161.6± ACRES
   GROSS DEVELOPABLE LOT AREA: 116.4 ACRES
   PROPOSED ON-SITE STREETS: 25.4 ACRES
   PROPOSED ON-SITE DETENTION BASINS: 6.61 ACRES
   PROPOSED ON-SITE DRAINAGE CHANNEL: 13.0 ACRES
   PROPOSED PUMP STATION: 1.0 ACRES
2. TOTAL NUMBER OF LOTS: 59 COMMERCIAL/INDUSTRIAL LOTS
   2 ON-SITE DETENTION BASINS, 1 ON-SITE PUMP STATION
   MINIMUM INDUSTRIAL LOT SIZE IS 0.90 ACRES
3. EXISTING ZONING – S-88
4. PROPOSED ZONING – S-88
5. GENERAL PLAN REGIONAL CATEGORY: VILLAGE
6. GENERAL PLAN LAND USE DESIGNATION: SPECIFIC PLAN AREA
7. COMMUNITY PLAN OR SUBREGIONAL PLAN: OTAY SUBREGIONAL PLAN, EAST OTAY MESA SPECIFIC PLAN
8. SPECIAL ASSESSMENT ACT PROCEEDINGS – MAY BE REQUESTED FOR THIS PROJECT.
9. PARK LAND DEDICATION NOT REQUIRED IN AN INDUSTRIAL ZONE.
10. STREET LIGHTS WILL BE INSTALLED TO COMPLY WITH THE REQUIREMENTS SPECIFIED BY THE COUNTY STANDARDS.
11. ALL LOTS WITHIN THIS SUBDIVISION HAVE A MINIMUM OF 100 SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING/COMMERCIAL/INDUSTRIAL UNIT ALLOWED BY THIS SUBDIVISION.
12. SOURCE OF TOPOGRAPHY:
    PREPARED BY PHOTO GEODETIC CORPORATION. TOPOGRAPHIC INFORMATION FLOWN ON OCTOBER 15, 2009
13. DISTRICTS:
    SEWER – SAN DIEGO COUNTY SANITATION DISTRICT
    WATER – OTAY WATER DISTRICT
    GAS & ELECTRIC – SDG&E
    TELEPHONE – AT&T
    FIRE – SAN DIEGO RURAL FIRE PROTECTION DISTRICT
    STREET LIGHTING – COUNTY OF SAN DIEGO
14. ALL PROPOSED UTILITIES TO BE UNDERGROUND EXCEPT WATER TREATMENT SWALES.
15. ALL ONSITE STREETS WILL BE PUBLIC.
16. IMPROVEMENTS, EASEMENTS AND DEDICATIONS WILL COMPLY WITH THE REQUIREMENTS SPECIFIED IN THE COUNTY STANDARDS.
17. ALL EXISTING EASEMENTS NOT REMAINING IN USE SHALL BE VACATED PRIOR TO RECORDATION OF THE FINAL MAP(S) SUBJECT TO THE SATISFACTION THE DIRECTOR OF PUBLIC WORKS.
18. STORM DRAIN DETENTIONS SHALL BE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE EAST OTAY MESA SPECFIC PLAN. THIS DETENTION WILL BE ACCOMPLISHED THROUGH UTILIZATION OF 2 DETENTION BASINS TO SERVE THE OVERALL PROJECT.
19. LAMBERT COORDINATES: 138–1785
20. THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HERON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.
21. THIS PROJECT IS A MULTI-UNIT SUBDIVISION. MULTIPLE FINAL MAPS MAY BE FILED PURSUANT TO SECTION 66456.1 OF THE SUBDIVISION MAP ACT
22. PRIOR TO THE APPROVAL OF ANY SITE PLAN FOR ANY DEVELOPMENT PROPOSAL WITHIN THE NOISE PROTECTION EASEMENT, THE APPLICANT SHALL:

    M-N-2: THE PERMIT COMPLIANCE ENGINEER SHALL ENSURE THAT ON-SITE GRADING OPERATIONS DO NOT OCCUR WITHIN 225 FEET OF ANY PROPERTY LINE THAT ABUTS PROPERTIES WHERE ACTIVE GRADING ACTIVITIES ARE OCCURRING. ON-SITE GRADING ACTIVITIES ADJACENT TO THE PROPERTY LINE MAY OCCUR IF GRADING ACTIVITIES FOR ADJACENT PROPERTIES ARE OCCURRING AT A MINIMUM DISTANCE OF 225 FEET FROM THE SHARED PROPERTY LINE. THE PERMIT COMPLIANCE ENGINEER (AS DEFINED IN SECTION 87.420 OF THE COUNTY GRADING ORDINANCE) SHALL DEMONSTRATE COMPLIANCE WITH THIS REQUIREMENT IN THE REGULAR REPORTS REQUIRED PURSUANT TO SECTION 87.420(a) OF THE COUNTY'S GRADING ORDINANCE. THE REGULAR REPORTS SHALL IDENTIFY ANY DAYS WHERE GRADING ACTIVITIES WERE RESTRICTED ON-SITE OR ON ADJACENT PROPERTIES IN ORDER TO ENSURE A MINIMUM DISTANCE OF 225 FEET BETWEEN GRADING ACTIVITIES.

GRAPHIC SCALE
200 0 100 200 400
1 INCH = 200FEET



VICINITY MAP
NO SCALE

EASEMENTS / EXCEPTIONS / RESTRICTIONS

WITH THE APPROVAL OF THE FINAL MAP(S), FOR THE DRAINAGE TO MEXICO EASEMENTS SHALL BE DEDICATED TO THE COUNTY OF SAN DIEGO OVER DETENTION BASINS, APPURTENANT STRUCTURES AND ACCESS ROUTES (SAID ROUTES NECESSARY TO MAINTAIN THE FOREGOING) TO A COUNTY MAINTAINED ROAD. THIS REQUIRES HYDROLOGIC AND HYDRAULIC REPORTS TO ENSURE APPROPRIATE PRIVATE STORMWATER DETENTION FACILITIES SUCH THAT PEAK STORMWATER FLOWS FROM THE ENTIRE SITE REMAIN THE SAME AS BEFORE THE PROJECT WAS DEVELOPED. ALL OF THE FOREGOING SHALL BE TO THE SATISFACTION OF THE DIRECTOR OF PUBLIC WORKS.

SEE PRELIMINARY TITLE REPORT BY STEWART TITLE OF CALIFORNIA, INC., ORDER NO. 01-0251783, DATED NOVEMBER 7 2005. ITEMS LISTED BELOW ARE SHOWN IN THE PRELIMINARY TITLE REPORT WHICH EFFECTS ASSESSOR'S PARCEL NO 648-070-21. PLOTTABLE ITEMS ARE DENOTED THUS: X WITH LOCATIONS KEYED THE SAME HEREON.

(3) AN EASEMENT TO OTAY MUNICIPAL WATER DISTRICT FOR THE CONSTRUCTION AND MAINTENANCE OF PIPELINES, RECORDED JUNE 5, 1968 AS FILE NO. 93912, OF OFFICIAL RECORDS.

(4) AN EASEMENT TO OTAY MUNICIPAL WATER DISTRICT FOR THE CONSTRUCTION AND MAINTENANCE OF PIPELINES, RECORDED JANUARY 6, 1970 AS FILE NO. 2033, OF OFFICIAL RECORDS.

(5) AN EASEMENT TO OTAY MUNICIPAL WATER DISTRICT FOR THE CONSTRUCTION AND MAINTENANCE OF PIPLINES, RECORDED FEBRUARY 26, 1974 AS FILE NO. 74-051081, OF OFFICIAL RECORDS.

(9) THE EFFECT OF A DOCUMENT OF JOINT USE BETWEEN SAN DIEGO GAS & ELECTRIC AND OTAY WATER DISTRICT, RECORDED JANUARY 11, 1999, AS FILE NO. 1999-0036773, OF OFFICIAL RECORDS, UNPLOTTABLE.

(10) 40' EASEMENT TO SAN DIEGO GAS & ELECTRIC FOR PUBLIC UTILITIES, RECORDED MARCH 24, 1999, AS FILE NO. 1999-0191043, OF OFFICIAL RECORDS.

(11) EXISTING 24" ACP TIJUANA WATER MAIN PER O.M.W.D. DWG. 16-3-7

(12) EXISTING 12" WATER MAIN PER O.M.W.D. DWG 16-7-7

(13) EXISTING 16" WATER MAIN PER O.M.W.D.DWG 16-7-7

(14) 30' INGRESS/EGRESS IN BENEFIT OF SUBJECT PROPERTY (SEE LEGAL DESCRIPTION, PARCEL 2)

EASEMENTS / EXCEPTIONS / RESTRICTIONS (CONTINUED)

(15) A 20' SEWER ACCESS AND MAINTENANCE EASEMENT TO COUNTY OF SAN DIEGO.

(16) DESIGNATED BIOLOGICAL OPEN SPACE SHALL COMPLY WITH COVENANTS AND RESTRICTIONS IDENTIFIED IN THE OTAY BUSINESS PARK EIR AND BIOLOGICAL REPORT

(17) LIMITED BUILDING ZONE. ALL LOTS AFFECTED SHALL COMPLY WITH BUILDING RESTRICTIONS AS IDENTIFIED IN THE OTAY BUSINESS PARK ENVIRONMENTAL IMPACT REPORT AND FIRE PROTECTION PLAN.

GRADING QUANTITIES

GRADED AREA 161.60 ACRES
CUT QUANTITIES 1,200,000 CYD
FILL QUANTITIES 1,200,000 CYD
IMPORT/EXPORT 0 CYD

NOTE: GRADING QUANTITIES ARE ESTIMATED FOR PERMIT PURPOSES ONLY AND ARE NOT INTENDED TO BE USED AS FINAL PAY QUANTITIES.

BASIS OF BEARINGS

THE BASIS OF BEARINGS FOR THIS SURVEY IS THE NAD 83, ZONE 6 GRID BEARING BETWEEN CITY OF SAN DIEGO CONTROL MONUMENTS 1494 AND 1496 AS SHOWN ON RECORD OF SURVEY 14492 BEARING: NORTH 44°35'23" WEST

OWNER/SUBDIVIDER

OTAY BUSINESS PARK
4370 LA JOLLA VILLAGE DRIVE, SUITE 640
SAN DIEGO, CA 92122
PHONE: (858) 535-9047
FAX: (858) 535-9100

[signature] 10/14/2011
RICARDO JNICH — DATE

X Tentative Map No. 5505
Tentative Parcel Map No. ____
Preliminary Grading Plan No. ____
Site Plan No. ____
Plot Plan No. ____
Other No. ____
Was approved on November 4, 2011 by
The Director of Planning and Land Use
The Zoning Administrator
X The San Diego Planning Commission
The San Diego County Board of Supervisors
BY [signature] Project Planning Chief
Name Title

No. Sheets 25

ASSESSOR'S PARCEL NUMBER
648-070-21

TAX RATE AREA
84035

ZONING APN 648-070-21

ZONE		
USE REGULATIONS		S88
ANIMAL REGULATIONS		–
DEVELOPMENT REGULATIONS	DENSITY	–
	LOT SIZE	30,000
	BUILDING TYPE	W
	MAX. FLOOR AREA	–
	FLOOR AREA RATIO	0.40
	HEIGHT	R
	LOT COVERAGE	0.40
	SETBACK	V
	OPEN SPACE	–
SPECIAL AREA REGULATIONS		B, P or G

LEGAL DESCRIPTION

PARCEL 1:

THE SOUTHEAST QUARTER OF SECTION 31, TOWNSHIP 18 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

EXCEPTION THEREFROM THAT PORTION CONVEYED TO UNITED STATES OF AMERICA, IMMIGRATION AND NATURALIZATION SEVICE BE DEED RECORDED APRIL 7, 2000, AS FILE NO. 2000-0177412, OFFICIAL RECORDS.

PARCEL 2:

AN EASEMENT FOR INGRESS AND EGRESS OVER THE EASTERLY 30 FEET OF THE WEST ONE-HALF OF SECTION 31, TOWNSHIP 18 SOUTH, RANGE 1 EAST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

REVISIONS	BY

Kimley-Horn and Associates, Inc.
© 2010 KIMLEY-HORN AND ASSOCIATES, INC.
Engineering, Planning, and Environmental Consultants
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REGISTERED PROFESSIONAL ENGINEER ADAM CORRAL No. C71034 CIVIL STATE OF CALIFORNIA

TITLE SHEET

SAN DIEGO
OTAY BUSINESS PARK
COUNTY OF SAN DIEGO, CALIFORNIA

SDC DPLU RCVD 10-17-11
TM5505

Date: JULY 2008
Scale: AS SHOWN
Drawn: SEB
Job: 095529000
Sheet C-1
1 of 20 Sheets

* APPROVED TM *

3

SECTION 3

PROPOSED CONDITION

PROJECT HYDROLOGY

Consistent with the approved Drainage Study for: Otay Business Park, TM 5505, this report analyzes runoff generated from two distinct watersheds, labeled Basins "A" and "B" within this study. Those basins are generally referred to as "west" (Basin A) and "east" (Basin B) within the approved study. A third basin, along the eastern project boundary, is also analyzed in that study. As with TM5505, the replacement TM will incorporate approximately 15.6 acres of the basin into Basin B. Since the only change to that watershed basin is a reduction in area consistent with the approved study for TM5505, no further analysis is provided.

The proposed project will generally maintain pre-project watershed areas and discharge locations. Pre-project hydrologic calculations are taken from the approved study for TM5505 and are provided in Section 5 for reference; for the pre-project condition, see the reduced copy of Exhibit B – Existing Condition also in that section. The proposed industrial land use at the project is consist with the approved TM, though the number of lots has been reduced to allow for a large rough graded pad along the eastern boundary. It is anticipated that this pad will be utilized by the future Point of Entry east of the project.

Post-Project Runoff Coefficient: In the post-project condition, the approved study utilized a runoff coefficient of 0.87 (95% imperviousness) for the future industrial lots. This value is inconsistent with the approved Hydromodification Management Plan for the project, which assumed 70% imperviousness, and is unrealistic given that the future lots will need to incorporate Low Impact Development measures, such as bioretention, for storm water treatment. Recent experience in the area has found that 80% imperviousness is a reasonable value to provide LID storm water treatment and have adequate impervious surface to support industrial land use. As such, the project proposes a maximum on-lot imperviousness of 80% and, per the County of San Diego Hydrology Manual, uses a runoff coefficient of 0.79. Should any future developments propose impervious surface exceeding 80%, they will likely need to provide additional peak flow and hydromodification mitigation on-site.

Post-Project Basin A: the project proposes to collect and convey runoff within a combination of private and public storm drain systems for conveyance to Detention Pond A in the southwest corner of the project. Offsite run-on from the north will be collected in a bypass storm drain system which will run down Alta Road and discharge at the southwest corner of the project, near the outlet for Detention Pond A. Given that the size and configuration of Basin A is generally consistent with the approved TM, this study utilizes the on-site time of concentration of 12 minutes calculated in the approved study for TM5505. Basin "A" is comprised of 317.1 acres and generates a peak runoff rate of approximately 474.7 cfs during the 100-year storm event. The area of the Basin increases slightly from the pre-project condition since the project will construct offsite portions of Airway Road and Siempre Viva Road, to the west, and runoff generated by those roads requires mitigation. Runoff from the roads will be collected and conveyed, within the onsite storm drain system, to Detention Pond A.

Post-Project Basin B: the project proposes to collect and convey runoff within a combination of private and public storm drain systems for conveyance to Detention Pond B in the southeast corner of the project. Offsite run-on from the north will be conveyed through the

project within an open channel, see Section 4 for additional channel calculations. The channel outlets at the southern boundary, near the outlet for Detention Pond B. Given that the configuration of Basin B is generally consistent with the approved TM, this study utilizes the on-site time of concentration of 8 minutes calculated in the approved study for TM5505. Basin "B" is comprised of 713.8 acres and generates a peak runoff rate of approximately 507.7 cfs during the 100-year storm event. The area of the Basin increases from the pre-project condition since the area east of the open channel will be graded as one large pad for use by the future Point of Entry to the east, and it incorporates approximately 15.6 acres of the adjacent watershed basin, consistent with TM5505. Runoff generated by this pad is collected and discharged directly to the open channel. Any future development on the pad will need to provide on-lot peak runoff and hydromodification mitigation; Detention Pond B is not sized to provide mitigation for that lot. Given that the proposed project will stabilize the pad with hydroseed and substantial erosion control, significantly slowing runoff and mimicking pre-project conditions, a runoff coefficient of 0.35 is applied to the pad for calculations in this study.

DETENTION CALCULATIONS

Calculations within this section utilize Hydraflow Hydrographs 2007 to route post-project 100-year peak flow rates through the proposed detention facilities. The two detention facilities are sized, and outlet configurations designed, to provide adequate hydromodification mitigation per the calculations provided in the project SWMP. Calculations demonstrate that peak outflow from those basins, combined with offsite run-on, will not exceed pre-project discharge rates.

Drawdown Calculations: The detention routing calculations in this section find that the two detention ponds will exceed the maximum allowable drawdown time of 96 hours. As currently designed, the facilities will require approximately 10 days to drawdown. This extended timeframe is consistent with, and slightly improves upon, the calculations provided in the approved study for TM5505. The approved Hydromodification Management Plan for the TM5505 provides a Vector Control Plan to address the drawdown issues. Though the project may still use the Vector Control Plan, it is anticipated that additional calculations will be performed at final engineering to reduce the drawdown time and potentially eliminate the need for the plan. Recent experience in the San Diego County area has found success in using SWMM continuous modeling software, as approved in the Final Hydromodification Management Plan, to reduce detention volumes, increase outlet orifice sizes, and decrease drawdown times, when compared to the results of the BMP Sizing Calculator. Due to the time intensive nature of the SWMM modeling calculations, however, they are generally not appropriate or necessary for use at discretionary level processing and will be performed at final engineering, if deemed necessary.

POST-PROJECT HYDROLOGY

LEGEND

PROPOSED GROUND CONTOURS
360 ——

EXISTING GROUND CONTOURS
360 —— INDEX
360 —— INTERMEDIATE

DRAINAGE BASIN DESIGNATOR

A / 0.57 — A = BASIN DESIGNATION (ALPHA CHARACTERS DESIGNATE REGIONAL RUNOFF AREAS); 0.57 = BASIN AREA (Acres)

DRAINAGE BASIN BOUNDARY

PROPERTY LINE

STORM DRAIN PIPE

STORM DRAIN CLEANOUT

STORM DRAIN CATCH BASIN

STORM DRAIN CURB INLET

PROPOSED STORM WATER COLLECTION BASIN & RISER

PROPOSED OPEN DRAINAGE CHANNEL

PROPOSED HEADWALL/ENERGY DISSIPATOR

PROPOSED BROW DITCH

NODE 140
Q100=474.7 CFS (UNDETAINED)
Q100=226.4 CFS MAX. (DETAINED)

NODE 230
Q100=669.2 CFS (UNDETAINED)
Q100=507.7 CFS MAX. (DETAINED)

STEVENS · CRESTO ENGINEERING, INC.
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OTAY BUSINESS PARK
TRACT 5505R
SAN DIEGO, CALIFORNIA

EXHIBIT "A"
PROPOSED CONDITION

*REDUCED- SEE FULL SIZE IN SECTION 6 *

DATE: 01/31/14
SCE NO. 12009.02
SHEET A
1 OF 1 SHEET

OTAY BUSINESS PARK - PROPOSED CONDITION

POST-PROJECT HYDROLOGY - BASIN A (WEST)

(Rational Method Procedure)

Otay Mesa, CA DESIGN STORM **100 YR** RUN: 1/30/14 4:27 PM

P6= 3.0

BASIN INFORMATION

DRAINAGE BASIN	AREA ac.	RUNOFF COEFF	T_C min	C x A	I_{100} in/hr	Undetained Q_{100} cfs	Approx. Detained Q_{100} cfs	REMARKS	TRBUTARY TO
A1	2.80	0.79	12.0	2.21	4.49	9.9	1.9	Lot (80% Impervious Max.)	POND A
A2	2.40	0.79	12.0	1.90	4.49	8.5	1.6	Lot (80% Impervious Max.)	POND A
A3	3.40	0.79	12.0	2.69	4.49	12.1	2.3	Lot (80% Impervious Max.)	POND A
A4	3.70	0.79	12.0	2.92	4.49	13.1	2.5	Lot (80% Impervious Max.)	POND A
A5	2.70	0.79	12.0	2.13	4.49	9.6	1.8	Lot (80% Impervious Max.)	POND A
A6	2.00	0.79	12.0	1.58	4.49	7.1	1.3	Lot (80% Impervious Max.)	POND A
A7	2.30	0.79	12.0	1.82	4.49	8.2	1.5	Lot (80% Impervious Max.)	POND A
A8	2.40	0.79	12.0	1.90	4.49	8.5	1.6	Lot (80% Impervious Max.)	POND A
A9	1.70	0.79	12.0	1.34	4.49	6.0	1.1	Lot (80% Impervious Max.)	POND A
A10	2.70	0.79	12.0	2.13	4.49	9.6	1.8	Lot (80% Impervious Max.)	POND A
A11	2.60	0.79	12.0	2.05	4.49	9.2	1.7	Lot (80% Impervious Max.)	POND A
A12	2.70	0.79	12.0	2.13	4.49	9.6	1.8	Lot (80% Impervious Max.)	POND A
A13	3.10	0.79	12.0	2.45	4.49	11.0	2.1	Lot (80% Impervious Max.)	POND A
A14	2.70	0.79	12.0	2.13	4.49	9.6	1.8	Lot (80% Impervious Max.)	POND A
A15	2.20	0.79	12.0	1.74	4.49	7.8	1.5	Lot (80% Impervious Max.)	POND A
A16	2.60	0.79	12.0	2.05	4.49	9.2	1.7	Lot (80% Impervious Max.)	POND A
A17	2.40	0.79	12.0	1.90	4.49	8.5	1.6	Lot (80% Impervious Max.)	POND A
A18	2.30	0.79	12.0	1.82	4.49	8.2	1.5	Lot (80% Impervious Max.)	POND A
A19	2.30	0.79	12.0	1.82	4.49	8.2	1.5	Lot (80% Impervious Max.)	POND A
A20	0.70	0.79	12.0	0.55	4.49	2.5	0.5	Lot (80% Impervious Max.)	POND A
A21	1.80	0.79	12.0	1.42	4.49	6.4	1.2	Lot (80% Impervious Max.)	POND A
A22	1.80	0.79	12.0	1.42	4.49	6.4	1.2	Lot (80% Impervious Max.)	POND A
A23	1.80	0.79	12.0	1.42	4.49	6.4	1.2	Lot (80% Impervious Max.)	POND A
A24	1.80	0.79	12.0	1.42	4.49	6.4	1.2	Lot (80% Impervious Max.)	POND A
A25	4.30	0.35	12.0	1.51	4.49	6.8	2.9	HYDROMODIFICATION BASIN - POND A	POND A
A26	1.90	0.58	12.0	1.10	4.49	5.0	1.3	DG Access Road	POND A
A27	1.50	0.35	39.3	0.53	2.09	1.1	1.1	Offsite	BYPASS
A-ST1	24.30	0.85	12.0	20.66	4.49	92.8	16.2	Streets	POND A
A-OS1	135.70	0.35	39.3	47.50	2.09	99.3	99.3	Offsite Run-on	BYPASS
A-OS2	72.70	0.35	39.3	25.45	2.09	53.2	53.2	Offsite Run-on	BYPASS
A-OS3	17.30	0.35	39.3	6.06	2.09	12.7	12.7	Offsite Run-on	BYPASS
A-OS4	2.50	0.35	39.3	0.88	2.09	1.8	1.8	Offsite Run-on	BYPASS
BASIN A Area=	317.1	0.47		148.6	Q_{100}=	474.7	226.4	MAX. ALLOWABLE RELEASE RATE: 226.37 CFS	

NOTE: A PRE-PROJECT TIME OF CONCENTRATION IS APPLIED TO THE UNDETAINED (UNDEVELOPED) BASINS SINCE THE PROPOSED DECREASE IN TIME OF CONCENTRATION WILL BE MITIGATED FOR BY REGIONAL AND ONLOT DETENTION FACILITIES.

UNDETAINED BASINS	AREA ac.	Q100 cfs
A26	1.5	1.1
A-OS1	135.7	99.3
A-OS2	72.7	53.2
A-OS3	17.3	12.7
A-OS4	2.5	1.8
TOTAL:	229.7	168.1

BASIN A MAX. ALLOWABLE Q_{100} (PRE-PROJECT Q_{100}): 226.37

SUBTRACT UNDETAINED Q_{100}: -168.1

POND A MAX. OUTFLOW Q_{100}: 58.3

POND A TRIBUTARY AREA: 87.4

POND A TRIBUTARY AREA, AVE. C: 0.78

POND A INFLOW: 306.5

OTAY BUSINESS PARK - PROPOSED CONDITION

POST-PROJECT HYDROLOGY - BASIN B (EAST)

(Rational Method Procedure)

Otay Mesa, CA | DESIGN STORM **100 YR** | RUN: 1/30/14 4:31 PM

P6= 3.0

BASIN INFORMATION

DRAINAGE BASIN	AREA ac.	RUNOFF COEFF	T_C min	C x A	I_{100} in/hr	Undetained Q_{100} cfs	Approx. Detained Q_{100} cfs	REMARKS	TRBUTARY TO
B1	1.90	0.79	8.0	1.50	5.84	8.8	0.7	Lot (80% Impervious Max.)	POND B
B2	2.20	0.79	8.0	1.74	5.84	10.1	0.8	Lot (80% Impervious Max.)	POND B
B3	5.70	0.79	8.0	4.50	5.84	26.3	2.0	Lot (80% Impervious Max.)	POND B
B4	4.30	0.79	8.0	3.40	5.84	19.8	1.5	Lot (80% Impervious Max.)	POND B
B5	4.80	0.79	8.0	3.79	5.84	22.1	1.7	Lot (80% Impervious Max.)	POND B
B6	4.30	0.79	8.0	3.40	5.84	19.8	1.5	Lot (80% Impervious Max.)	POND B
B7	4.00	0.79	8.0	3.16	5.84	18.4	1.4	Lot (80% Impervious Max.)	POND B
B8	1.30	0.35	8.0	0.46	5.84	2.7	0.5	Lot (80% Impervious Max.)	POND B
B9	1.30	0.79	8.0	1.03	5.84	6.0	0.5	Lot (80% Impervious Max.)	POND B
B10	2.60	0.79	8.0	2.05	5.84	12.0	0.9	Lot (80% Impervious Max.)	POND B
B11	3.30	0.79	8.0	2.61	5.84	15.2	1.2	Lot (80% Impervious Max.)	POND B
B12	46.60	0.35	39.3	16.31	2.09	34.1	34.1	Offsite	BYPASS
B-ST1	1.70	0.85	8.0	1.45	5.84	8.4	0.6	Streets	POND B
B-ST2	1.10	0.85	8.0	0.94	5.84	5.5	0.4	Streets	POND B
B-OS1	628.70	0.35	39.3	220.05	2.09	459.9	459.9	Offsite Run-on	BYPASS
BASIN A Area=	713.8	0.37		266.4	Q_{100}=	669.2	507.7	MAX. ALLOWABLE RELEASE RATE: 507.73 CFS	

NOTE: A PRE-PROJECT TIME OF CONCENTRATION IS APPLIED TO THE UNDETAINED (UNDEVELOPED) BASINS SINCE THE PROPOSED DECREASE IN TIME OF CONCENTRATION WILL BE MITIGATED FOR BY REGIONAL AND ONLOT DETENTION FACILITIES.

UNDETAINED BASINS	AREA ac.	Q100 cfs
B12	46.6	34.1
B-OS1	628.7	459.9
TOTAL:	675.3	494.0

BASIN B MAX. ALLOWABLE Q_{100} (PRE-PROJECT Q_{100}): 507.73

SUBTRACT UNDETAINED Q_{100}: -494.0

POND B MAX. OUTFLOW Q_{100}: 13.7

POND B TRIBUTARY AREA: 38.5

POND B TRIBUTARY AREA, AVE. C: 0.78

POND B INFLOW: 175.2

DETENTION ROUTING

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Thursday, Jan 30, 2014

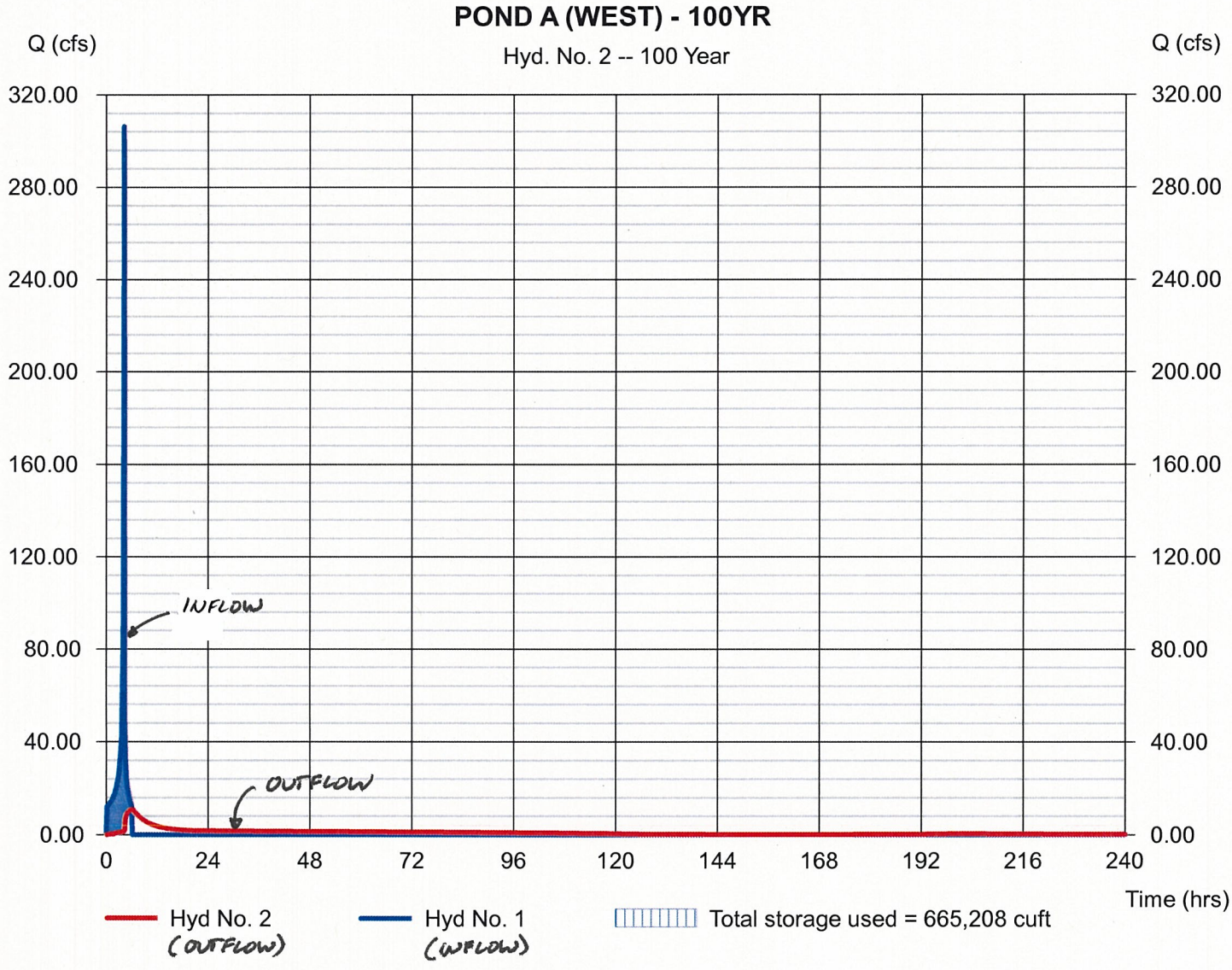
Hyd. No. 2

POND A (WEST) - 100YR

Hydrograph type	=	Reservoir	Peak discharge	=	10.90 cfs ← MAX. 100YR OUTFLOW ALLOWED = 58.3CFS
Storm frequency	=	100 yrs	Time to peak	=	6.00 hrs
Time interval	=	12 min	Hyd. volume	=	736,319 cuft
Inflow hyd. No.	=	1 - POND A (WEST) - 100YR INFLOW	Max. Elevation	=	500.53 ft
Reservoir name	=	POND A (WEST)	Max. Storage	=	665,208 cuft

Storage Indication method used.

ANTICIPATED TOP OF POND. ~ 503 FT
FB = 503 - 500.53 = 2.47 FT



Pond Report

Hydraflow Hydrographs by Intelisolve v9.23 — Thursday, Jan 30, 2014

Pond No. 1 - POND A (WEST)

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 496.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	496.00	137,150	0	0
1.00	497.00	141,440	139,276	139,276
2.00	498.00	145,750	143,575	282,851
3.00	499.00	150,100	147,905	430,756
4.00	500.00	154,500	152,280	583,035
5.00	501.00	158,900	156,679	739,714
6.00	502.00	163,300	161,079	900,793 ← MIN. STORAGE FOR HYDROMODIFICATION = 734,350 CF

Culvert / Orifice Structures

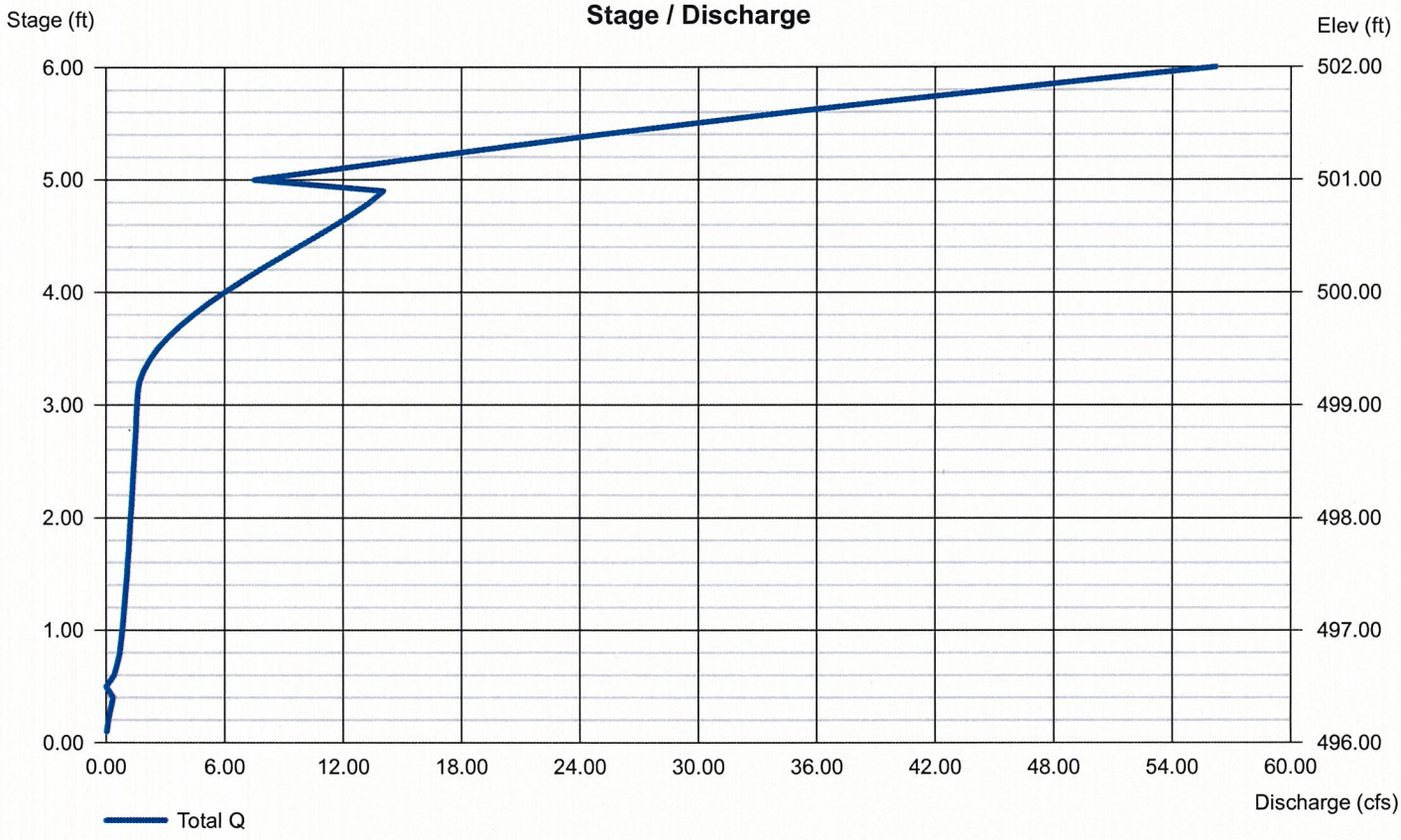
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 6.00	22.00	0.00	0.00
Span (in)	= 6.00	22.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 496.00	499.10	0.00	0.00
Length (ft)	= 0.50	0.50	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.40	0.00	0.00	0.00
Crest El. (ft)	= 500.90	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

OUTLET SIZING/ELEVATIONS PER HYDROMODIFICATION CALCULATIONS, SEE SWMP

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

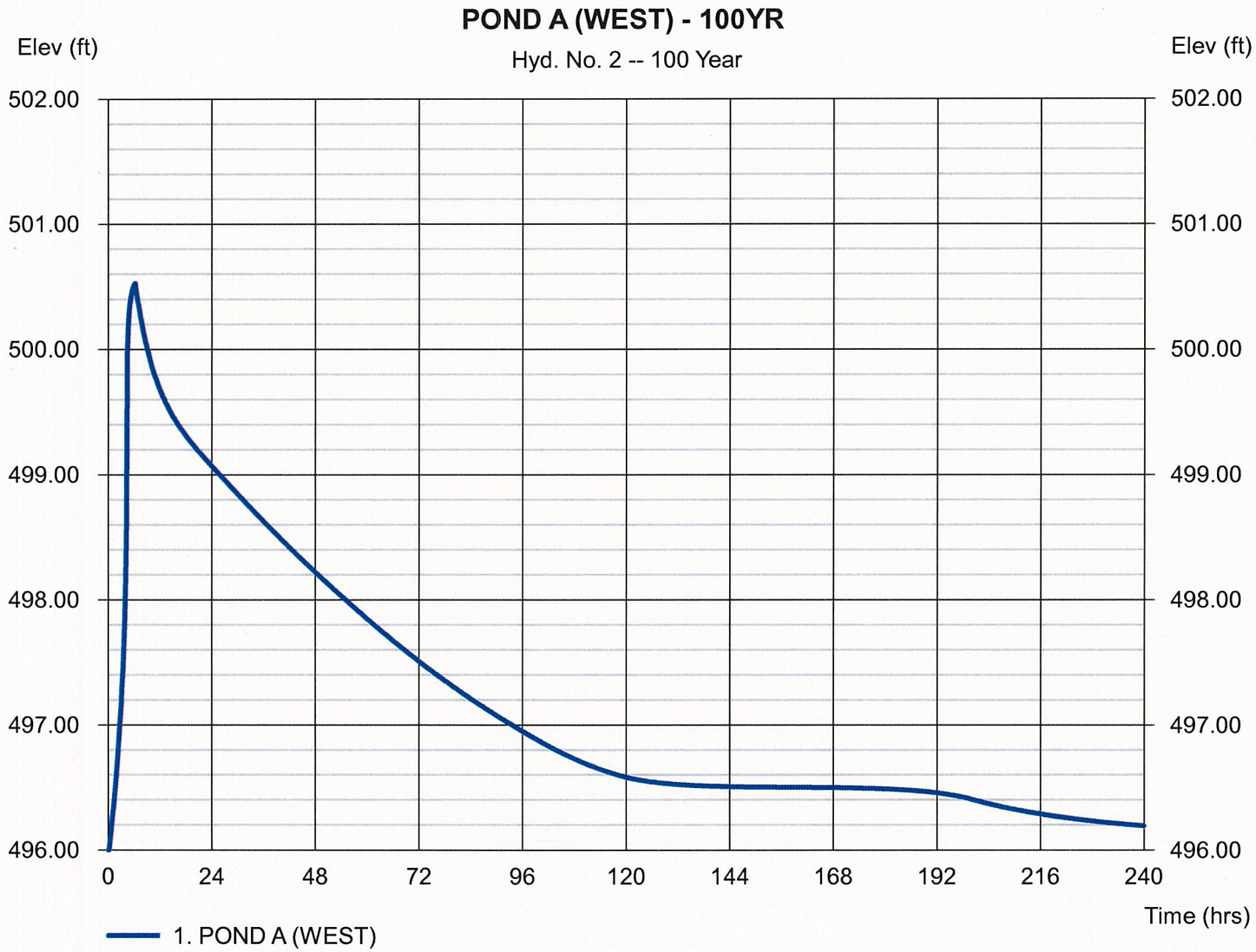
Hydraflow Hydrographs by Intelisolve v9.23 — Thursday, Jan 30, 2014

Hyd. No. 2

POND A (WEST) - 100YR

Hydrograph type	= Reservoir	Peak discharge	= 10.90 cfs
Storm frequency	= 100 yrs	Time to peak	= 6.00 hrs
Time interval	= 12 min	Hyd. volume	= 736,319 cuft
Inflow hyd. No.	= 1 - POND A (WEST) - 100YR INFLOW	Max. Elevation	= 500.53 ft
Reservoir name	= POND A (WEST)	Max. Storage	= 665,208 cuft

Storage Indication method used.



RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 1/30/2014
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 12 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 87.4 ACRES
RUNOFF COEFFICIENT 0.78
PEAK DISCHARGE 306.5 CFS

POND A (WEST) PEAK 100YR INFLOW

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 12	DISCHARGE (CFS) = 12.3
TIME (MIN) = 24	DISCHARGE (CFS) = 12.5
TIME (MIN) = 36	DISCHARGE (CFS) = 13.1
TIME (MIN) = 48	DISCHARGE (CFS) = 13.5
TIME (MIN) = 60	DISCHARGE (CFS) = 14.2
TIME (MIN) = 72	DISCHARGE (CFS) = 14.6
TIME (MIN) = 84	DISCHARGE (CFS) = 15.5
TIME (MIN) = 96	DISCHARGE (CFS) = 16
TIME (MIN) = 108	DISCHARGE (CFS) = 17.2
TIME (MIN) = 120	DISCHARGE (CFS) = 17.8
TIME (MIN) = 132	DISCHARGE (CFS) = 19.4
TIME (MIN) = 144	DISCHARGE (CFS) = 20.3
TIME (MIN) = 156	DISCHARGE (CFS) = 22.5
TIME (MIN) = 168	DISCHARGE (CFS) = 23.9
TIME (MIN) = 180	DISCHARGE (CFS) = 27.4
TIME (MIN) = 192	DISCHARGE (CFS) = 29.7
TIME (MIN) = 204	DISCHARGE (CFS) = 36.3
TIME (MIN) = 216	DISCHARGE (CFS) = 41.3
TIME (MIN) = 228	DISCHARGE (CFS) = 60.7
TIME (MIN) = 240	DISCHARGE (CFS) = 85.3
TIME (MIN) = 252	DISCHARGE (CFS) = 306.5 ← PEAK Q_{100}
TIME (MIN) = 264	DISCHARGE (CFS) = 48.7
TIME (MIN) = 276	DISCHARGE (CFS) = 32.6
TIME (MIN) = 288	DISCHARGE (CFS) = 25.5
TIME (MIN) = 300	DISCHARGE (CFS) = 21.3
TIME (MIN) = 312	DISCHARGE (CFS) = 18.6
TIME (MIN) = 324	DISCHARGE (CFS) = 16.6
TIME (MIN) = 336	DISCHARGE (CFS) = 15
TIME (MIN) = 348	DISCHARGE (CFS) = 13.8
TIME (MIN) = 360	DISCHARGE (CFS) = 12.8
TIME (MIN) = 372	DISCHARGE (CFS) = 0

Hydrograph Report

Hydraflow Hydrographs by Intelisolve v9.23 — Thursday, Jan 30, 2014

Hyd. No. 4

POND B (EAST) - 100YR

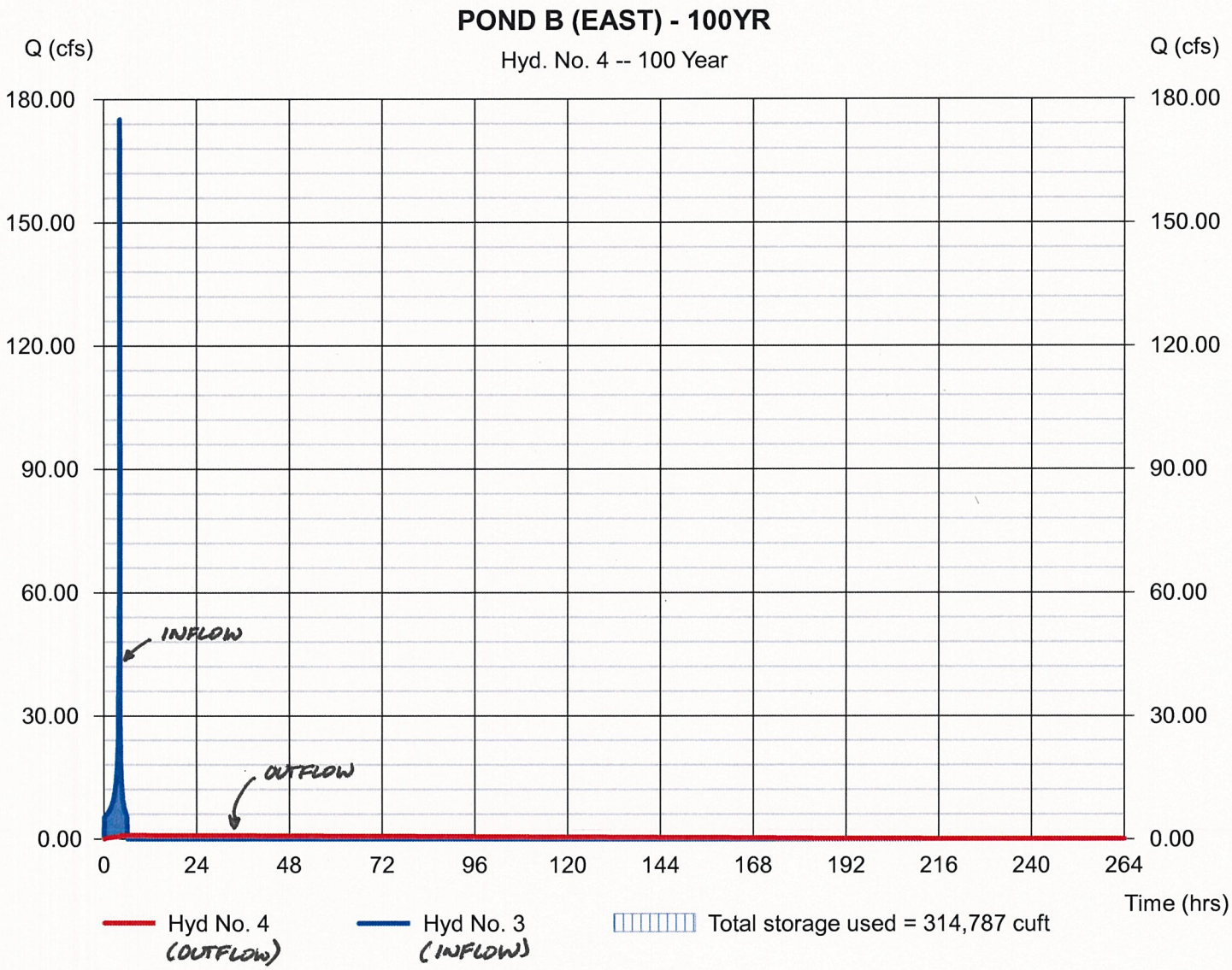
Hydrograph type	=	Reservoir	Peak discharge	=	0.785 cfs
Storm frequency	=	100 yrs	Time to peak	=	6.13 hrs
Time interval	=	8 min	Hyd. volume	=	324,900 cuft
Inflow hyd. No.	=	3 - POND B (EAST) - 100YR INFLOW	Max. Elevation	=	504.17 ft
Reservoir name	=	POND B (EAST)	Max. Storage	=	314,787 cuft

MAX. 100YR OUTFLOW ALLOWED = 13.7 CFS

Storage Indication method used.

ANTICIPATED TOP OF POND ~ 508 FT

FB = 508 - 504.17 FT = 3.83 FT



Pond Report

Pond No. 2 - POND B (EAST)

Pond Data

Contours - User-defined contour areas. Conic method used for volume calculation. Begining Elevation = 493.00 ft

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)	
0.00	493.00	20,780	0	0	
1.00	494.00	22,000	21,385	21,385	
2.00	495.00	23,270	22,630	44,015	
3.00	496.00	24,560	23,910	67,924	
4.00	497.00	25,880	25,215	93,139	
5.00	498.00	27,230	26,549	119,689	
6.00	499.00	28,620	27,919	147,608	
7.00	500.00	30,030	29,319	176,927	
8.00	501.00	31,470	30,744	207,671	
9.00	502.00	32,950	32,204	239,875	
10.00	503.00	34,460	33,699	273,574	
11.00	504.00	36,000	35,224	308,798	
12.00	505.00	37,580	36,784	345,581	
13.00	506.00	39,185	38,376	383,957	
14.00	507.00	40,720	39,946	423,903	← MIN. STORAGE @ 14 FT FOR HYDROMODIFICATION = 293,350 CF
15.00	508.00	42,360	41,533	465,436	

Culvert / Orifice Structures

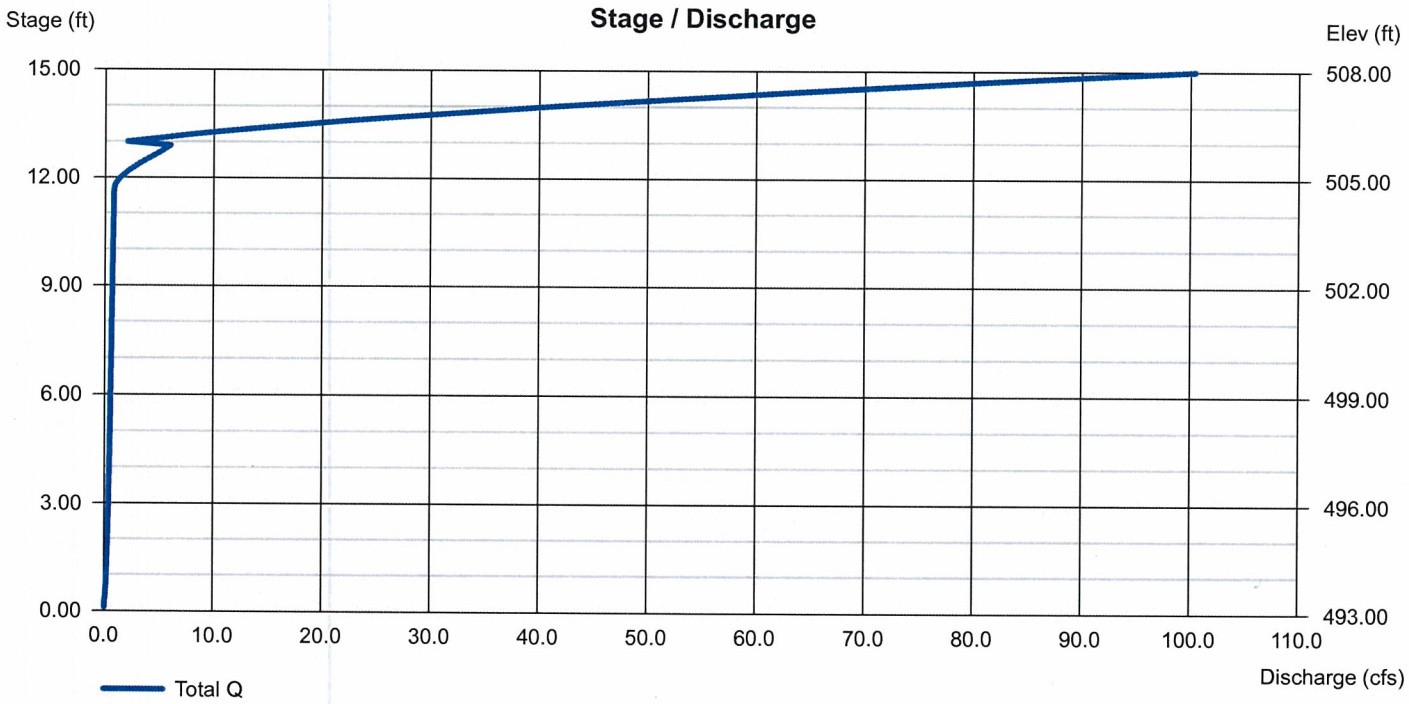
	[A]	[B]	[C]	[PrfRsr]
Rise (in)	= 3.00	16.00	0.00	0.00
Span (in)	= 3.00	16.00	0.00	0.00
No. Barrels	= 1	1	0	0
Invert El. (ft)	= 493.00	504.65	0.00	0.00
Length (ft)	= 0.50	0.50	0.00	0.00
Slope (%)	= 0.00	0.00	0.00	n/a
N-Value	= .013	.013	.013	n/a
Orifice Coeff.	= 0.60	0.60	0.60	0.60
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len (ft)	= 9.40	0.00	0.00	0.00
Crest El. (ft)	= 506.00	0.00	0.00	0.00
Weir Coeff.	= 3.33	3.33	3.33	3.33
Weir Type	= Rect	---	---	---
Multi-Stage	= No	No	No	No
Exfil.(in/hr)	= 0.000 (by Contour)			
TW Elev. (ft)	= 0.00			

OUTLET SIZING/ELEVATIONS PER HYDROMODIFICATION CALCULATIONS, SEE SWMP

Note: Culvert/Orifice outflows are analyzed under inlet (ic) and outlet (oc) control. Weir risers checked for orifice conditions (ic) and submergence (s).



Hydrograph Report

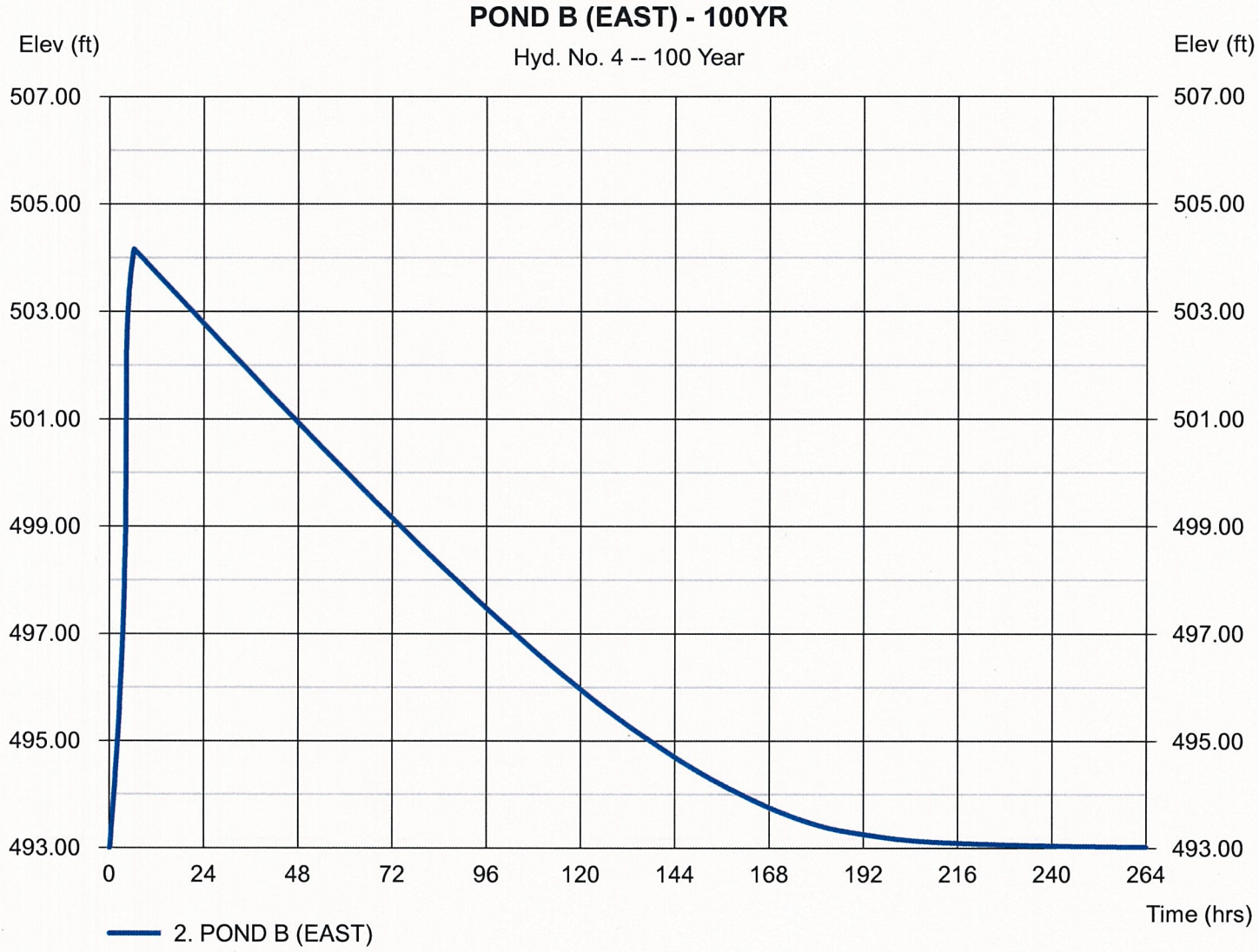
Hydraflow Hydrographs by Intelisolve v9.23 — Thursday, Jan 30, 2014

Hyd. No. 4

POND B (EAST) - 100YR

Hydrograph type	= Reservoir	Peak discharge	= 0.785 cfs
Storm frequency	= 100 yrs	Time to peak	= 6.13 hrs
Time interval	= 8 min	Hyd. volume	= 324,900 cuft
Inflow hyd. No.	= 3 - POND B (EAST) - 100YR INFLOW	Max. Elevation	= 504.17 ft
Reservoir name	= POND B (EAST)	Max. Storage	= 314,787 cuft

Storage Indication method used.



RATIONAL METHOD HYDROGRAPH PROGRAM

RUN DATE 1/30/2014
HYDROGRAPH FILE NAME Text1
TIME OF CONCENTRATION 8 MIN.
6 HOUR RAINFALL 3 INCHES
BASIN AREA 38.5 ACRES
RUNOFF COEFFICIENT 0.78
PEAK DISCHARGE 175.2 CFS

POND B (EAST) PEAK 100YR INFLOW

TIME (MIN) = 0	DISCHARGE (CFS) = 0
TIME (MIN) = 8	DISCHARGE (CFS) = 5.4
TIME (MIN) = 16	DISCHARGE (CFS) = 5.5
TIME (MIN) = 24	DISCHARGE (CFS) = 5.6
TIME (MIN) = 32	DISCHARGE (CFS) = 5.7
TIME (MIN) = 40	DISCHARGE (CFS) = 5.9
TIME (MIN) = 48	DISCHARGE (CFS) = 6
TIME (MIN) = 56	DISCHARGE (CFS) = 6.2
TIME (MIN) = 64	DISCHARGE (CFS) = 6.3
TIME (MIN) = 72	DISCHARGE (CFS) = 6.6
TIME (MIN) = 80	DISCHARGE (CFS) = 6.7
TIME (MIN) = 88	DISCHARGE (CFS) = 7
TIME (MIN) = 96	DISCHARGE (CFS) = 7.2
TIME (MIN) = 104	DISCHARGE (CFS) = 7.5
TIME (MIN) = 112	DISCHARGE (CFS) = 7.7
TIME (MIN) = 120	DISCHARGE (CFS) = 8.1
TIME (MIN) = 128	DISCHARGE (CFS) = 8.4
TIME (MIN) = 136	DISCHARGE (CFS) = 8.9
TIME (MIN) = 144	DISCHARGE (CFS) = 9.2
TIME (MIN) = 152	DISCHARGE (CFS) = 9.8
TIME (MIN) = 160	DISCHARGE (CFS) = 10.2
TIME (MIN) = 168	DISCHARGE (CFS) = 11.1
TIME (MIN) = 176	DISCHARGE (CFS) = 11.6
TIME (MIN) = 184	DISCHARGE (CFS) = 12.9
TIME (MIN) = 192	DISCHARGE (CFS) = 13.7
TIME (MIN) = 200	DISCHARGE (CFS) = 15.7
TIME (MIN) = 208	DISCHARGE (CFS) = 17
TIME (MIN) = 216	DISCHARGE (CFS) = 20.8
TIME (MIN) = 224	DISCHARGE (CFS) = 23.6
TIME (MIN) = 232	DISCHARGE (CFS) = 34.7
TIME (MIN) = 240	DISCHARGE (CFS) = 49
TIME (MIN) = 248	DISCHARGE (CFS) = 175.2 ← PEAK Q_{100}
TIME (MIN) = 256	DISCHARGE (CFS) = 27.8
TIME (MIN) = 264	DISCHARGE (CFS) = 18.6
TIME (MIN) = 272	DISCHARGE (CFS) = 14.6
TIME (MIN) = 280	DISCHARGE (CFS) = 12.2
TIME (MIN) = 288	DISCHARGE (CFS) = 10.6
TIME (MIN) = 296	DISCHARGE (CFS) = 9.5
TIME (MIN) = 304	DISCHARGE (CFS) = 8.6
TIME (MIN) = 312	DISCHARGE (CFS) = 7.9
TIME (MIN) = 320	DISCHARGE (CFS) = 7.3
TIME (MIN) = 328	DISCHARGE (CFS) = 6.9
TIME (MIN) = 336	DISCHARGE (CFS) = 6.5
TIME (MIN) = 344	DISCHARGE (CFS) = 6.1
TIME (MIN) = 352	DISCHARGE (CFS) = 5.8
TIME (MIN) = 360	DISCHARGE (CFS) = 5.5
TIME (MIN) = 368	DISCHARGE (CFS) = 0

4

SECTION 4

CHANNEL CALCULATIONS

PROPOSED CHANNEL

Consistent with TM5505, the project proposes to utilize an open channel to convey project run-on through Basin B. The location of the channel is moved to the west to both facilitate the ability to create a rough graded pad for the future Point of Entry to the east, and to also align the flow path more closely to the natural conveyance. Channel calculations, utilizing peak 100-year flow rates, are provided in this section.

LEGEND

PROPOSED GROUND CONTOURS
360

EXISTING GROUND CONTOURS
360 INDEX
360 INTERMEDIATE

DRAINAGE BASIN DESIGNATOR

A / 0.57 — BASIN DESIGNATION (ALPHA CHARACTERS DESIGNATE REGIONAL RUNOFF AREAS)
BASIN AREA (Acres)

DRAINAGE BASIN BOUNDARY

PROPERTY LINE

STORM DRAIN PIPE

STORM DRAIN CLEANOUT

STORM DRAIN CATCH BASIN

STORM DRAIN CURB INLET

PROPOSED STORM WATER COLLECTION BASIN & RISER

PROPOSED OPEN DRAINAGE CHANNEL

PROPOSED HEADWALL/ENERGY DISSIPATOR

PROPOSED BROW DITCH

NTS

STEVENS · CRESTO ENGINEERING, INC.
CIVIL ENGINEERS · PLANNERS · LAND SURVEYORS
9465 CHESAPEAKE DRIVE
SUITE 200
SAN DIEGO, CA 92123-1352
PHONE: 858.694.5660
FAX: 858.694.5661
www.scengr.com

OTAY BUSINESS PARK
TRACT 5505R
SAN DIEGO, CALIFORNIA

EXHIBIT "A"
PROPOSED CONDITION

DATE: 01/31/14
SCE NO. 12009.02
SHEET A
1 OF 1 SHEET

Open Channel - Section A
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

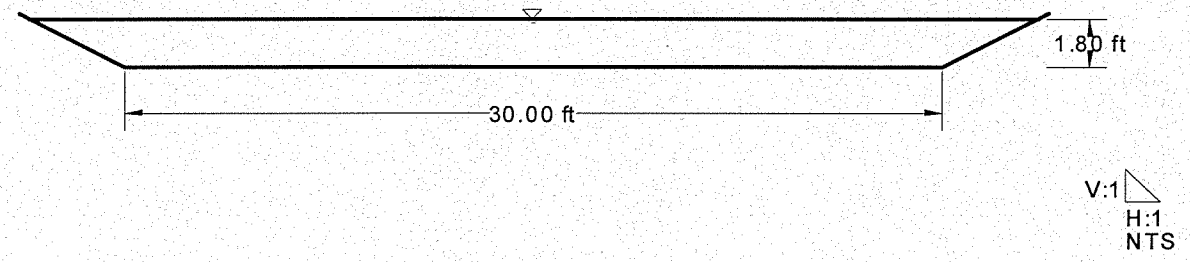
Input Data		
Mannings Coeffic	0.035	
Slope	0.020000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	30.00	ft
Discharge	494.00	cfs

Results		
Depth	1.80	ft
Flow Area	60.4	ft²
Wetted Perim	38.04	ft
Top Width	37.20	ft
Critical Depth	1.95	ft
Critical Slope	0.015309	ft/ft
Velocity	8.17	ft/s
Velocity Head	1.04	ft
Specific Energ	2.84	ft
Froude Numb	1.13	
Flow Type	Supercritical	

X-Sec, Open Channel - Section A
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.035	
Slope	0.020000	ft/ft
Depth	1.80	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	30.00	ft
Discharge	494.00	cfs



Open Channel - Section B
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

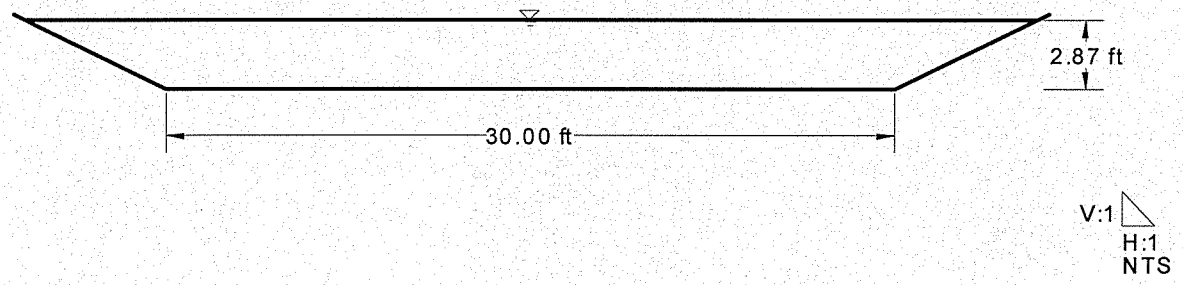
Input Data		
Mannings Coeffic	0.035	
Slope	0.004000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	30.00	ft
Discharge	494.00	cfs

Results		
Depth	2.87	ft
Flow Area	102.7	ft²
Wetted Perim	42.85	ft
Top Width	41.49	ft
Critical Depth	1.95	ft
Critical Slope	0.015309	ft/ft
Velocity	4.81	ft/s
Velocity Head	0.36	ft
Specific Energ	3.23	ft
Froude Numb	0.54	
Flow Type	Subcritical	

X-Sec, Open Channel - Section B
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.035	
Slope	.004000	ft/ft
Depth	2.87	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	30.00	ft
Discharge	494.00	cfs



Open Channel - Section C
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

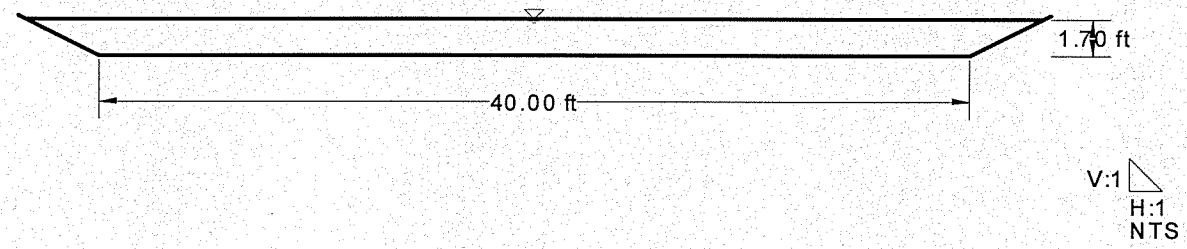
Input Data		
Mannings Coeffic	0.035	
Slope	0.014000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	40.00	ft
Discharge	494.00	cfs

Results		
Depth	1.70	ft
Flow Area	73.6	ft²
Wetted Perim	47.58	ft
Top Width	46.78	ft
Critical Depth	1.63	ft
Critical Slope	0.015874	ft/ft
Velocity	6.72	ft/s
Velocity Head	0.70	ft
Specific Energ	2.40	ft
Froude Numb	0.94	
Flow Type	Subcritical	

X-Sec, Open Channel - Section C
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.035	
Slope	.014000	ft/ft
Depth	1.70	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	40.00	ft
Discharge	494.00	cfs



Open Channel - Section D
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

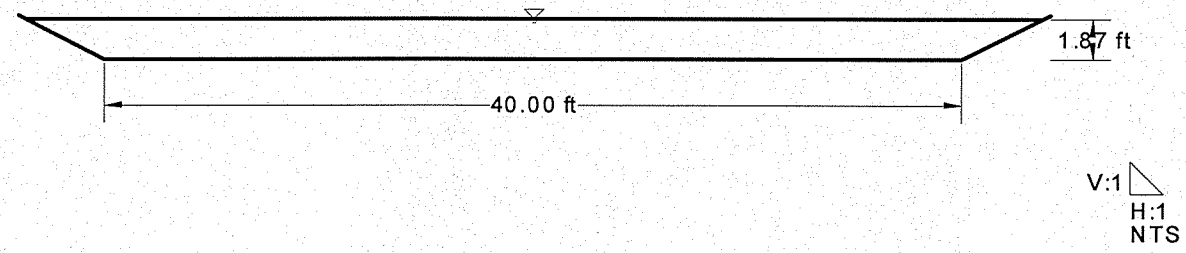
Input Data		
Mannings Coeffic	0.035	
Slope	.010000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	40.00	ft
Discharge	494.00	cfs

Results		
Depth	1.87	ft
Flow Area	81.9	ft²
Wetted Perim	48.37	ft
Top Width	47.49	ft
Critical Depth	1.63	ft
Critical Slope	0.015874	ft/ft
Velocity	6.03	ft/s
Velocity Head	0.57	ft
Specific Energ	2.44	ft
Froude Numb	0.81	
Flow Type	Subcritical	

X-Sec, Open Channel - Section D
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.035	
Slope	0.010000	ft/ft
Depth	1.87	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	40.00	ft
Discharge	494.00	cfs



Open Channel - Section E
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

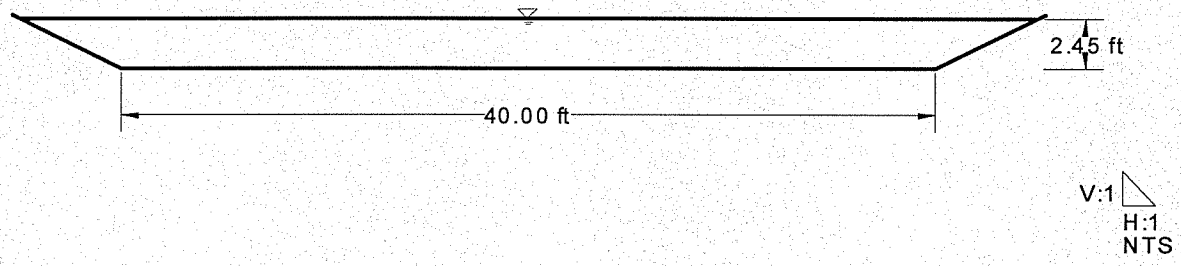
Input Data		
Mannings Coeffic	0.035	
Slope	.004000	ft/ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	40.00	ft
Discharge	494.00	cfs

Results		
Depth	2.45	ft
Flow Area	110.1	ft²
Wetted Perim	50.96	ft
Top Width	49.81	ft
Critical Depth	1.63	ft
Critical Slope	0.015874	ft/ft
Velocity	4.49	ft/s
Velocity Head	0.31	ft
Specific Energ	2.76	ft
Froude Numb	0.53	
Flow Type	Subcritical	

X-Sec, Open Channel - Section E
Cross Section for Trapezoidal Channel

Project Description	
Worksheet	Open Channel - Sec
Flow Element	Trapezoidal Channe
Method	Manning's Formula
Solve For	Channel Depth

Section Data		
Mannings Coeffic	0.035	
Slope	.004000	ft/ft
Depth	2.45	ft
Left Side Slope	2.00	H : V
Right Side Slope	2.00	H : V
Bottom Width	40.00	ft
Discharge	494.00	cfs



5

SECTION 5

REFERENCE CALCULATIONS/ EXHIBITS

EXCERPTS FROM THE APPROVED DRAINAGE STUDY FOR TM5505

The following excerpts are provided for reference: Exhibit B – Existing Condition (Reduced), Exhibit C – Proposed Condition (Reduced), Pre-Project Hydrology, and Proposed Detention Routing.

REFERENCE EXHIBITS

LEGEND

PROJECT BOUNDARY

BASIN BOUNDARY

ACREAGE (XX AC)

NODE

NORTH

GRAPHIC SCALE

500 0 250 500 1000

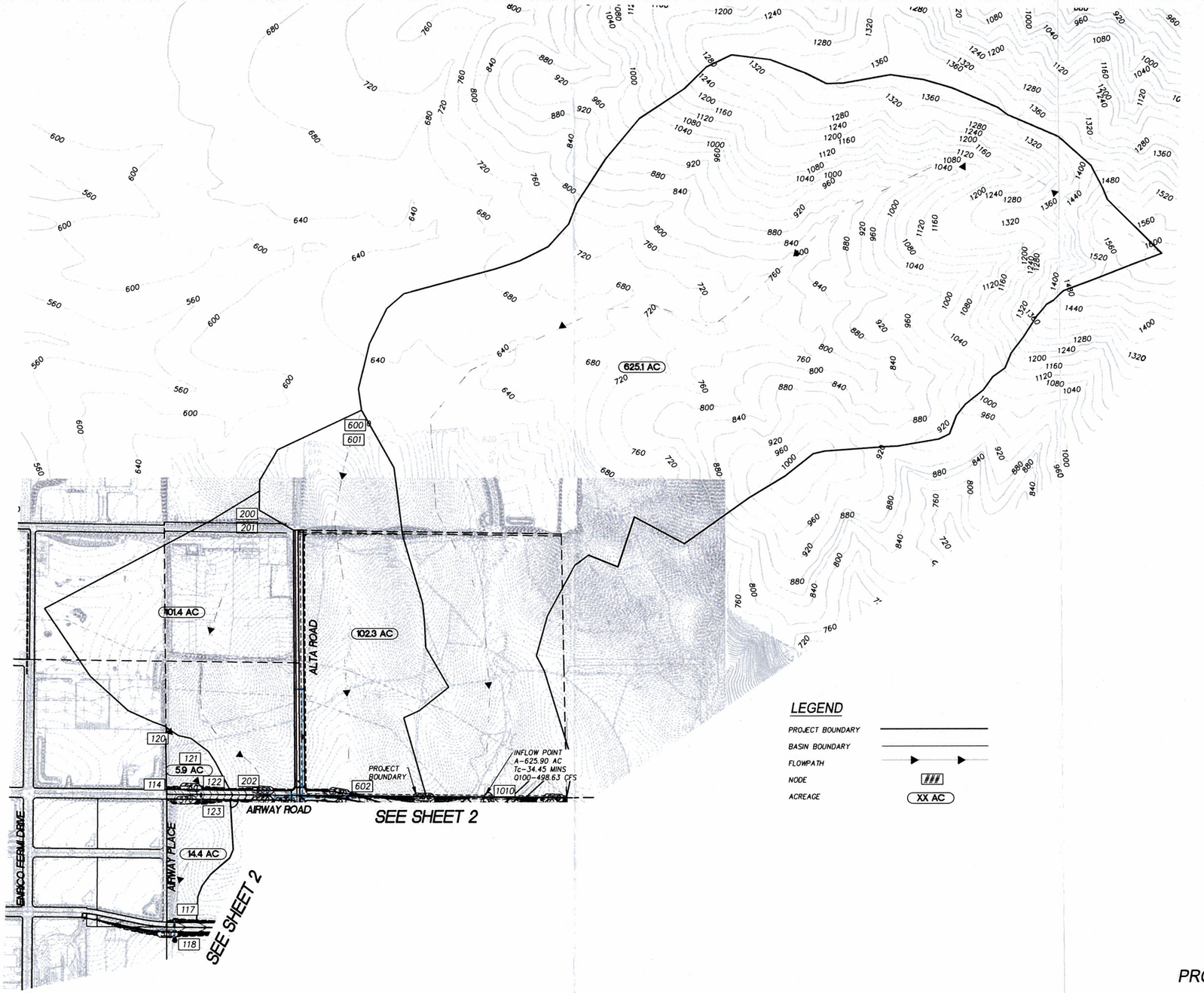
(IN FEET)

1 inch = 500 ft.

OTAY BUSINESS PARK

EXHIBIT B
EXISTING CONDITION
DRAINAGE EXHIBIT

K:\SND_LDEV\055529000 - Otay Business Park\Drainage Study\Exhibits\Exhibit B - Existing Cond\529000-Existing Cond.dwg 9-20-10-1:18 PM



LEGEND

PROJECT BOUNDARY	———
BASIN BOUNDARY	———
FLOWPATH	▶——▶
NODE	###
ACREAGE	XX AC

NORTH

GRAPHIC SCALE

500 0 250 500 1000

(IN FEET)
1 inch = 500 ft.

OTAY BUSINESS PARK

EXHIBIT C
PROPOSED CONDITION (1 of 2)
DRAINAGE EXHIBIT

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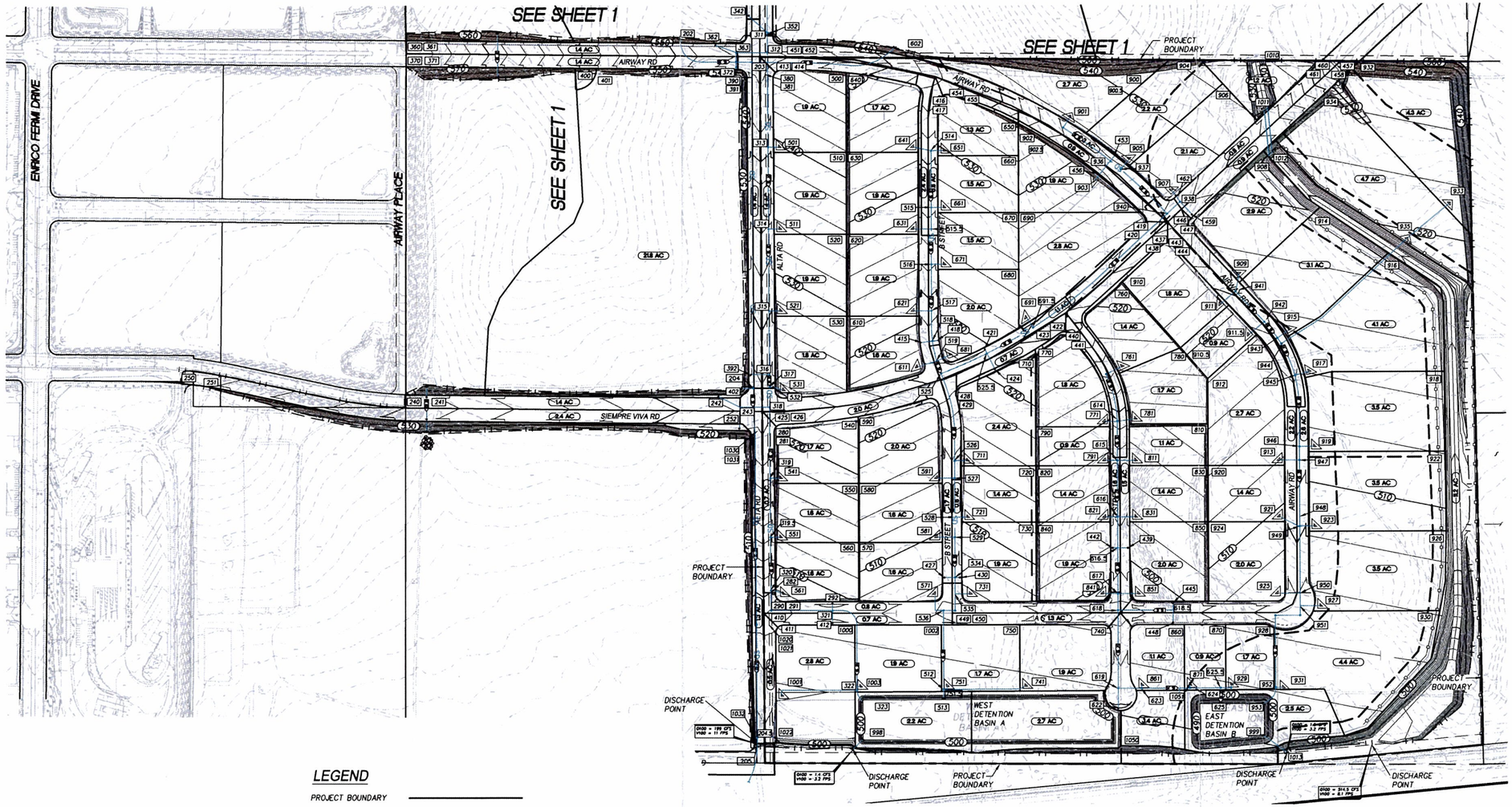
K:\SND_LDEV\095529000 - Otay Business Park\Drainage Study\Exhibits\Exhibit C - Proposed Cond\529000-Proposed Cond.dwg 9-20-10-1:14 PM



NORTH

GRAPHIC SCALE

200 0 100 200 400

(IN FEET)
1 inch = 200 ft.

LEGEND

- PROJECT BOUNDARY
- BASIN BOUNDARY
- FLOWPATH
- ACREAGE (XX AC)
- NODE
- PROPOSED RIP-RAP

OTAY BUSINESS PARK

EXHIBIT C
PROPOSED CONDITION (2 of 2)
DRAINAGE EXHIBIT

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K:\SND_LDEV\095529000 - Otay Business Park\Drainage Study\Exhibits\Exhibit C - Proposed Cond\529000-Proposed Cond.dwg 9-20-10-1:16 PM

PRE-PROJECT HYDROLOGY

```
****************************************************************************

          RATIONAL METHOD HYDROLOGY COMPUTER PROGRAM PACKAGE
          Reference: SAN DIEGO COUNTY FLOOD CONTROL DISTRICT
                       2003,1985,1981 HYDROLOGY MANUAL
       (c) Copyright 1982-2006 Advanced Engineering Software (aes)
           Ver. 2.0 Release Date: 06/01/2005  License ID 1499

                          Analysis prepared by:

                      Kimley-Horn & Associates, Inc
                          401 B Street Suite 600
                           San Diego, CA 92101
                               619-234-9411

 ************************* DESCRIPTION OF STUDY *************************
* Otay Business Park                                                    *
* Existing 100 Year Storm                                               *
* 6/23/2009 KDC                                                         *
 ************************************************************************

  FILE NAME: 100.DAT
  TIME/DATE OF STUDY: 11:14 04/19/2010
------------------------------------------------------------------------
  USER SPECIFIED HYDROLOGY AND HYDRAULIC MODEL INFORMATION:
------------------------------------------------------------------------
  2003 SAN DIEGO MANUAL CRITERIA

  USER SPECIFIED STORM EVENT(YEAR) = 100.00
  6-HOUR DURATION PRECIPITATION (INCHES) =   3.000
  SPECIFIED MINIMUM PIPE SIZE(INCH) =  18.00
  SPECIFIED PERCENT OF GRADIENTS(DECIMAL) TO USE FOR FRICTION SLOPE = 0.95
  SPECIFIED CONSTANT RUNOFF COEFFICIENT = 0.350
  NOTE: USE MODIFIED RATIONAL METHOD PROCEDURES FOR CONFLUENCE ANALYSIS
  *USER-DEFINED STREET-SECTIONS FOR COUPLED PIPEFLOW AND STREETFLOW MODEL*
     HALF-  CROWN TO   STREET-CROSSFALL:   CURB  GUTTER-GEOMETRIES:  MANNING
     WIDTH  CROSSFALL  IN-  / OUT-/PARK-  HEIGHT  WIDTH  LIP   HIKE  FACTOR
NO.   (FT)     (FT)     SIDE / SIDE/ WAY    (FT)    (FT)  (FT)   (FT)    (n)
===  =====  =========  ================  ======  =====  ======  =====  =======
  1   30.0     20.0    0.018/0.018/0.020   0.67    2.00 0.0313 0.167 0.0150

  GLOBAL STREET FLOW-DEPTH CONSTRAINTS:
    1. Relative Flow-Depth =  0.00 FEET
       as (Maximum Allowable Street Flow Depth) - (Top-of-Curb)
    2. (Depth)*(Velocity) Constraint =  6.0 (FT*FT/S)
  *SIZE PIPE WITH A FLOW CAPACITY GREATER THAN
   OR EQUAL TO THE UPSTREAM TRIBUTARY PIPE.*

****************************************************************************
  FLOW PROCESS FROM NODE    100.00 TO NODE    110.00 IS CODE =  21
------------------------------------------------------------------------
  >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
========================================================================
  *USER SPECIFIED(GLOBAL):
  GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
  S.C.S. CURVE NUMBER (AMC II) =   0
  INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
  UPSTREAM ELEVATION(FEET) =    655.00
  DOWNSTREAM ELEVATION(FEET) =    650.00
  ELEVATION DIFFERENCE(FEET) =      5.00
  SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.490
  WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
           THE MAXIMUM OVERLAND FLOW LENGTH =    90.00
           (Reference: Table 3-1B of Hydrology Manual)
           THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
   100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.090
  SUBAREA RUNOFF(CFS) =      0.32
  TOTAL AREA(ACRES) =      0.15   TOTAL RUNOFF(CFS) =      0.32

****************************************************************************
```

```
 FLOW PROCESS FROM NODE    110.00 TO NODE    120.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    640.00  DOWNSTREAM(FEET) =    525.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  3950.00   CHANNEL SLOPE =  0.0291
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.32
 FLOW VELOCITY(FEET/SEC) =   2.56 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =  25.72   Tc(MIN.) =  33.21
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    120.00 =    4050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    120.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.331
 *USER SPECIFIED(GLOBAL):
 NATURAL DESERT LANDSCAPING RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   99.00   SUBAREA RUNOFF(CFS) =   80.75
 TOTAL AREA(ACRES) =       99.2   TOTAL RUNOFF(CFS) =      80.88
 TC(MIN.) =  33.21

****************************************************************************
 FLOW PROCESS FROM NODE    120.00 TO NODE    130.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    525.00  DOWNSTREAM(FEET) =    516.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1000.00   CHANNEL SLOPE =  0.0090
 CHANNEL FLOW THRU SUBAREA(CFS) =      80.88
 FLOW VELOCITY(FEET/SEC) =   4.23 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   3.94   Tc(MIN.) =  37.16
 LONGEST FLOWPATH FROM NODE    100.00 TO NODE    130.00 =    5050.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  1 ARE:
 TIME OF CONCENTRATION(MIN.) =  37.16
 RAINFALL INTENSITY(INCH/HR) =   2.17
 TOTAL STREAM AREA(ACRES) =    99.15
 PEAK FLOW RATE(CFS) AT CONFLUENCE =     80.88

****************************************************************************
 FLOW PROCESS FROM NODE    150.00 TO NODE    160.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    638.00
 DOWNSTREAM ELEVATION(FEET) =    632.00
 ELEVATION DIFFERENCE(FEET) =      6.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    7.126
 WARNING: INITIAL SUBAREA FLOW PATH LENGTH IS GREATER THAN
          THE MAXIMUM OVERLAND FLOW LENGTH =    92.00
          (Reference: Table 3-1B of Hydrology Manual)
          THE MAXIMUM OVERLAND FLOW LENGTH IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.289
 SUBAREA RUNOFF(CFS) =      0.22
```

```
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.22

****************************************************************************
 FLOW PROCESS FROM NODE    160.00 TO NODE    170.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    632.00  DOWNSTREAM(FEET) =    530.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  3730.00   CHANNEL SLOPE =  0.0273
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.22
 FLOW VELOCITY(FEET/SEC) =   2.48 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =  25.06   Tc(MIN.) =  32.19
 LONGEST FLOWPATH FROM NODE    150.00 TO NODE    170.00 =    3830.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    170.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.378
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =  132.40   SUBAREA RUNOFF(CFS) =  110.20
 TOTAL AREA(ACRES) =      132.5   TOTAL RUNOFF(CFS) =     110.28
 TC(MIN.) =  32.19

****************************************************************************
 FLOW PROCESS FROM NODE    170.00 TO NODE    130.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    516.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  1700.00   CHANNEL SLOPE =  0.0082
 CHANNEL FLOW THRU SUBAREA(CFS) =     110.28
 FLOW VELOCITY(FEET/SEC) =   4.44 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.39   Tc(MIN.) =  38.58
 LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    5530.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    130.00 IS CODE =   1
----------------------------------------------------------------------------
 >>>>>DESIGNATE INDEPENDENT STREAM FOR CONFLUENCE<<<<<
 >>>>>AND COMPUTE VARIOUS CONFLUENCED STREAM VALUES<<<<<
============================================================================
 TOTAL NUMBER OF STREAMS =  2
 CONFLUENCE VALUES USED FOR INDEPENDENT STREAM  2 ARE:
 TIME OF CONCENTRATION(MIN.) =  38.58
 RAINFALL INTENSITY(INCH/HR) =   2.12
 TOTAL STREAM AREA(ACRES) =   132.50
 PEAK FLOW RATE(CFS) AT CONFLUENCE =    110.28

 ** CONFLUENCE DATA **
 STREAM      RUNOFF       Tc       INTENSITY       AREA
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)     (ACRE)
     1        80.88     37.16        2.168         99.15
     2       110.28     38.58        2.116        132.50

 RAINFALL INTENSITY AND TIME OF CONCENTRATION RATIO
 CONFLUENCE FORMULA USED FOR  2 STREAMS.

 ** PEAK FLOW RATE TABLE **
 STREAM      RUNOFF       Tc       INTENSITY
 NUMBER       (CFS)     (MIN.)   (INCH/HOUR)
     1       187.10     37.16        2.168
     2       189.23     38.58        2.116
```

```
 COMPUTED CONFLUENCE ESTIMATES ARE AS FOLLOWS:
 PEAK FLOW RATE(CFS) =     189.23   Tc(MIN.) =   38.58
 TOTAL AREA(ACRES) =      231.6
 LONGEST FLOWPATH FROM NODE    150.00 TO NODE    130.00 =    5530.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    130.00 TO NODE    140.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    516.00  DOWNSTREAM(FEET) =    495.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =   500.00   CHANNEL SLOPE =  0.0420
 CHANNEL FLOW THRU SUBAREA(CFS) =     189.23
 FLOW VELOCITY(FEET/SEC) =  11.81 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   0.71   Tc(MIN.) =  39.28
 LONGEST FLOWPATH FROM NODE    150.00 TO NODE    140.00 =    6030.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.091
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   77.60   SUBAREA RUNOFF(CFS) =   56.80
 TOTAL AREA(ACRES) =      309.2   TOTAL RUNOFF(CFS) =     226.37
 TC(MIN.) =  39.28

****************************************************************************
 FLOW PROCESS FROM NODE    140.00 TO NODE    140.00 IS CODE =  13
----------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
============================================================================

****************************************************************************
 FLOW PROCESS FROM NODE    190.00 TO NODE    200.00 IS CODE =  21
----------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
============================================================================
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =   1560.00
 DOWNSTREAM ELEVATION(FEET) =   1520.00
 ELEVATION DIFFERENCE(FEET) =     40.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.833
 SUBAREA RUNOFF(CFS) =      0.24
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

****************************************************************************
 FLOW PROCESS FROM NODE    200.00 TO NODE    201.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =   1520.00  DOWNSTREAM(FEET) =    800.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  4000.00   CHANNEL SLOPE =  0.1800
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 NOTE: CHANNEL SLOPE OF .1 WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.24
 FLOW VELOCITY(FEET/SEC) =   4.74 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =  14.05   Tc(MIN.) =  20.32
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    201.00 =    4100.00 FEET.
```

PRE-PROJECT BASIN A (WEST)

```
****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    201.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.199
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =  110.20   SUBAREA RUNOFF(CFS) =  123.40
 TOTAL AREA(ACRES) =      110.3   TOTAL RUNOFF(CFS) =     123.51
 TC(MIN.) =  20.32

****************************************************************************
 FLOW PROCESS FROM NODE    201.00 TO NODE    210.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    800.00  DOWNSTREAM(FEET) =    620.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  4000.00   CHANNEL SLOPE =  0.0450
 CHANNEL FLOW THRU SUBAREA(CFS) =     123.51
 FLOW VELOCITY(FEET/SEC) =  10.73 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   6.21   Tc(MIN.) =  26.53
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    210.00 =    8100.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    210.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.694
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =  386.70   SUBAREA RUNOFF(CFS) =  364.58
 TOTAL AREA(ACRES) =      497.0   TOTAL RUNOFF(CFS) =     468.57
 TC(MIN.) =  26.53

****************************************************************************
 FLOW PROCESS FROM NODE    210.00 TO NODE    220.00 IS CODE =  52
----------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
============================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    620.00  DOWNSTREAM(FEET) =    530.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  4900.00   CHANNEL SLOPE =  0.0184
 CHANNEL FLOW THRU SUBAREA(CFS) =     468.57
 FLOW VELOCITY(FEET/SEC) =  10.39 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   7.86   Tc(MIN.) =  34.39
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    220.00 =   13000.00 FEET.

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    220.00 IS CODE =  81
----------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
============================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.279
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =  128.20   SUBAREA RUNOFF(CFS) =  102.25
 TOTAL AREA(ACRES) =      625.2   TOTAL RUNOFF(CFS) =     498.63
 TC(MIN.) =  34.39

****************************************************************************
 FLOW PROCESS FROM NODE    220.00 TO NODE    230.00 IS CODE =  52
----------------------------------------------------------------------------
```

```
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    530.00  DOWNSTREAM(FEET) =    485.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2890.00   CHANNEL SLOPE =  0.0156
 CHANNEL FLOW THRU SUBAREA(CFS) =     498.63
 FLOW VELOCITY(FEET/SEC) =   9.76 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =   4.93   Tc(MIN.) =  39.32
 LONGEST FLOWPATH FROM NODE    190.00 TO NODE    230.00 =   15890.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    230.00 TO NODE    230.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  2.090
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   68.90   SUBAREA RUNOFF(CFS) =   50.40
 TOTAL AREA(ACRES) =      694.1   TOTAL RUNOFF(CFS) =     507.73
 TC(MIN.) =  39.32

**************************************************************************
 FLOW PROCESS FROM NODE      0.00 TO NODE      0.00 IS CODE =  13
--------------------------------------------------------------------------
 >>>>>CLEAR THE MAIN-STREAM MEMORY<<<<<
==========================================================================

**************************************************************************
 FLOW PROCESS FROM NODE    310.00 TO NODE    315.00 IS CODE =  21
--------------------------------------------------------------------------
 >>>>>RATIONAL METHOD INITIAL SUBAREA ANALYSIS<<<<<
==========================================================================
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
 INITIAL SUBAREA FLOW-LENGTH(FEET) =   100.00
 UPSTREAM ELEVATION(FEET) =    572.00
 DOWNSTREAM ELEVATION(FEET) =    562.00
 ELEVATION DIFFERENCE(FEET) =     10.00
 SUBAREA OVERLAND TIME OF FLOW(MIN.) =    6.267
 WARNING: THE MAXIMUM OVERLAND FLOW SLOPE, 10.%, IS USED IN Tc CALCULATION!
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  6.833
 SUBAREA RUNOFF(CFS) =      0.24
 TOTAL AREA(ACRES) =      0.10   TOTAL RUNOFF(CFS) =      0.24

**************************************************************************
 FLOW PROCESS FROM NODE    315.00 TO NODE    320.00 IS CODE =  52
--------------------------------------------------------------------------
 >>>>>COMPUTE NATURAL VALLEY CHANNEL FLOW<<<<<
 >>>>>TRAVELTIME THRU SUBAREA<<<<<
==========================================================================
 ELEVATION DATA: UPSTREAM(FEET) =    562.00  DOWNSTREAM(FEET) =    506.00
 CHANNEL LENGTH THRU SUBAREA(FEET) =  2000.00   CHANNEL SLOPE =  0.0280
 NOTE: CHANNEL FLOW OF 1. CFS WAS ASSUMED IN VELOCITY ESTIMATION
 CHANNEL FLOW THRU SUBAREA(CFS) =       0.24
 FLOW VELOCITY(FEET/SEC) =   2.51 (PER LACFCD/RCFC&WCD HYDROLOGY MANUAL)
 TRAVEL TIME(MIN.) =  13.28   Tc(MIN.) =  19.55
 LONGEST FLOWPATH FROM NODE    310.00 TO NODE    320.00 =    2100.00 FEET.

**************************************************************************
 FLOW PROCESS FROM NODE    320.00 TO NODE    320.00 IS CODE =  81
--------------------------------------------------------------------------
 >>>>>ADDITION OF SUBAREA TO MAINLINE PEAK FLOW<<<<<
==========================================================================
  100 YEAR RAINFALL INTENSITY(INCH/HOUR) =  3.281
 *USER SPECIFIED(GLOBAL):
 GENERAL INDUSTRIAL RUNOFF COEFFICIENT = .3500
 S.C.S. CURVE NUMBER (AMC II) =   0
```

PRE-PROJECT BASIN B (EAST) OUTFLOW

```
 AREA-AVERAGE RUNOFF COEFFICIENT = 0.3500
 SUBAREA AREA(ACRES) =   15.60   SUBAREA RUNOFF(CFS) =   17.91
 TOTAL AREA(ACRES) =       15.7   TOTAL RUNOFF(CFS) =      18.03
 TC(MIN.) =  19.55
================================================================================
 END OF STUDY SUMMARY:
 TOTAL AREA(ACRES)      =       15.7  TC(MIN.) =     19.55
 PEAK FLOW RATE(CFS)    =      18.03
================================================================================
================================================================================
 END OF RATIONAL METHOD ANALYSIS
```

DETENTION ROUTING

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Jun 23 2009, 3:40 PM

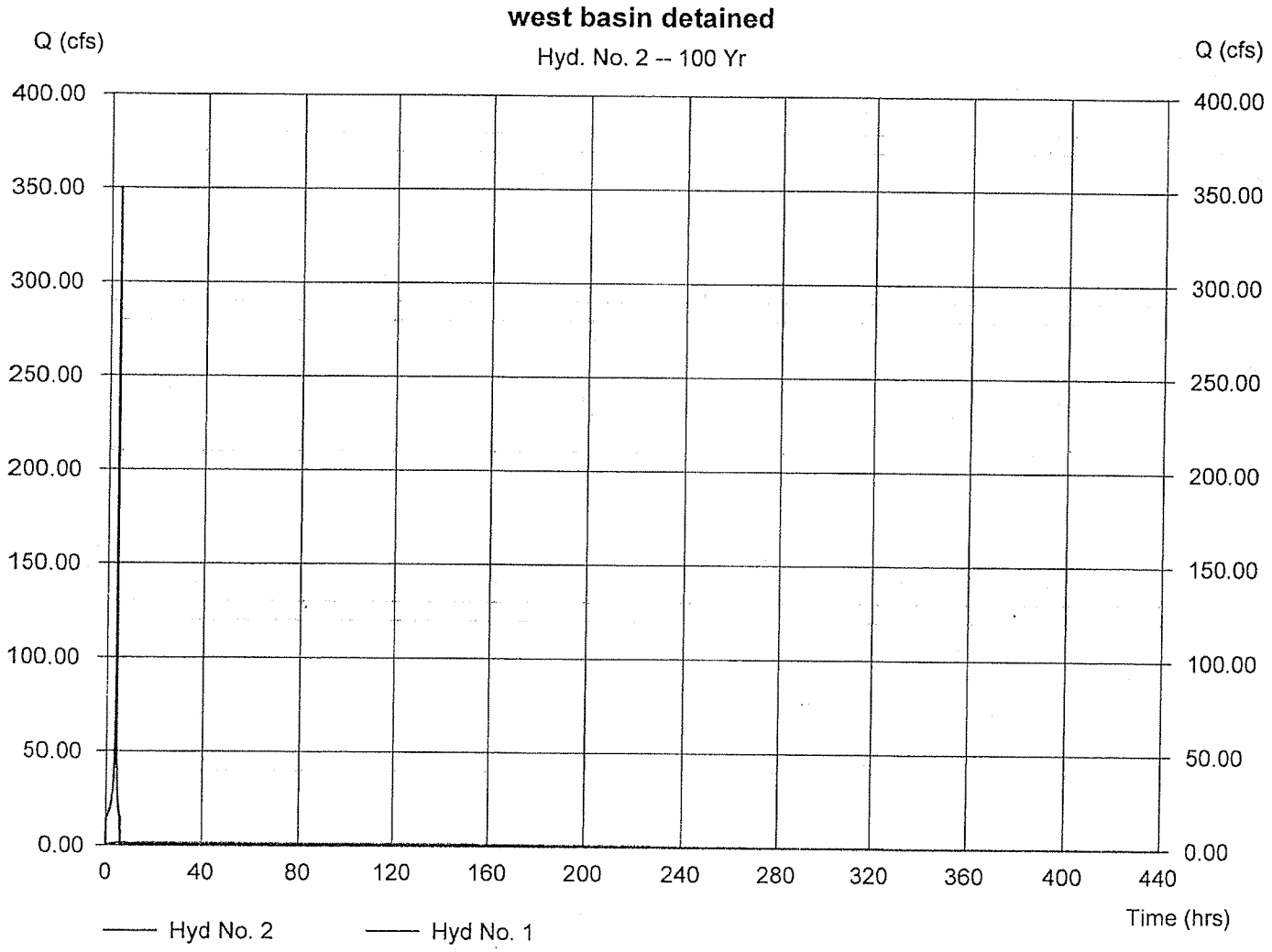
Hyd. No. 2

west basin detained

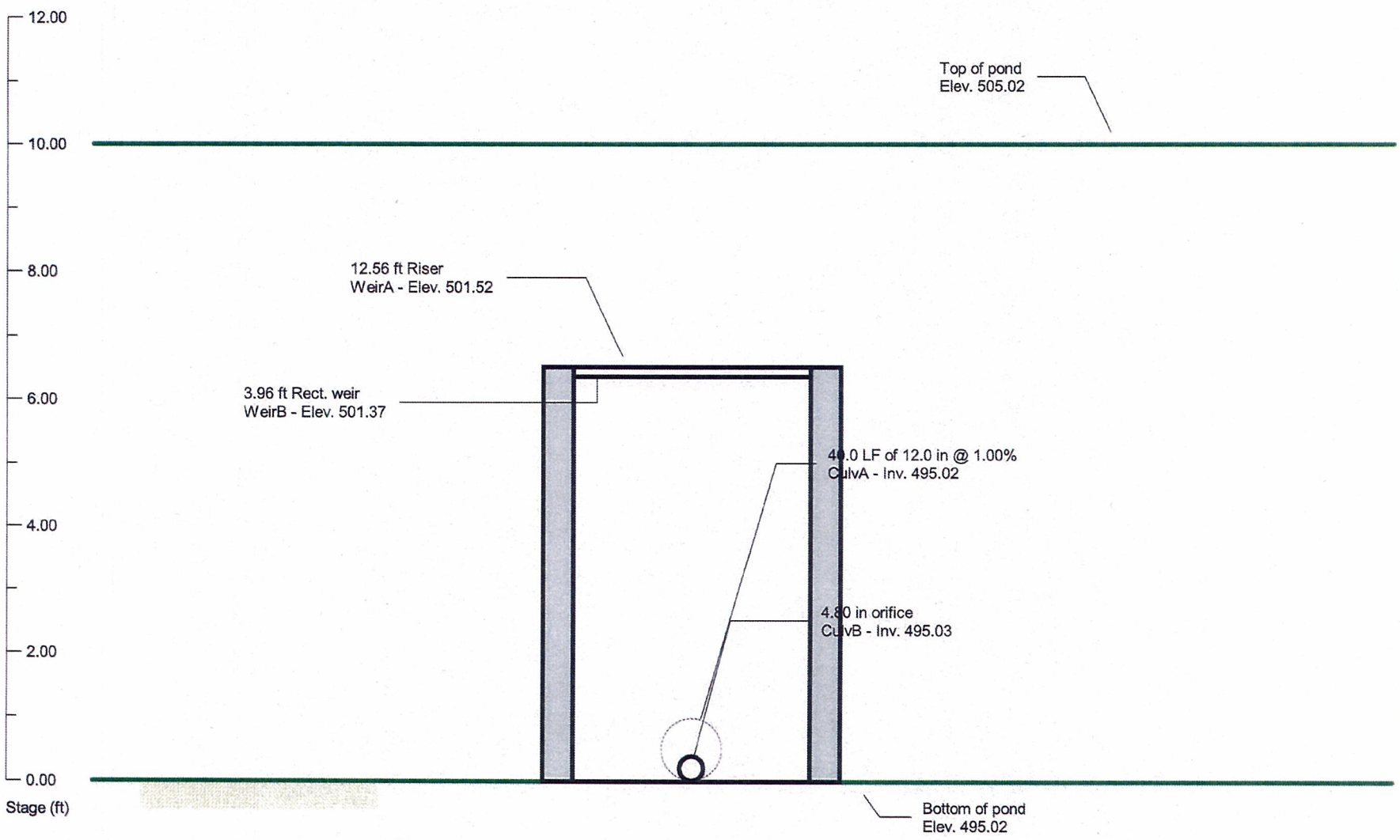
Hydrograph type	= Reservoir	Peak discharge	= 1.41 cfs
Storm frequency	= 100 yrs	Time interval	= 12 min
Inflow hyd. No.	= 1	Max. Elevation	= 501.11 ft
Reservoir name	= Basin A (S.W. corner)	Max. Storage	= 847,387 cuft

Storage Indication method used.

Hydrograph Volume = 863,234 cuft



Pond No. 1 - Basin A (S.W. corner)



Front View

NTS - Looking Downstream

Inflow hydrograph = 1. Manual - west basin

Hydrograph Plot

Hydraflow Hydrographs by Intelisolve

Tuesday, Jun 23 2009, 3:28 PM

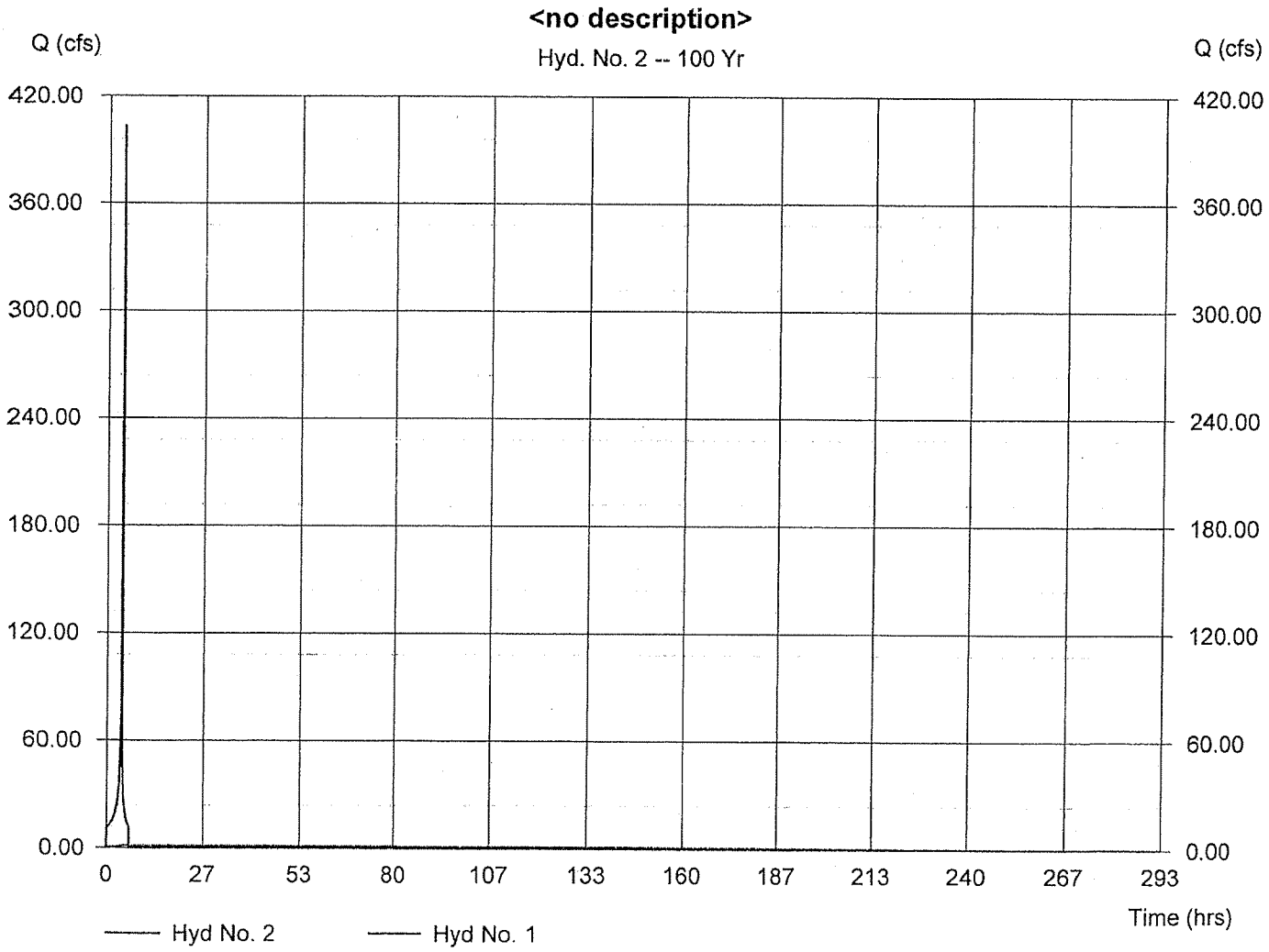
Hyd. No. 2

<no description>

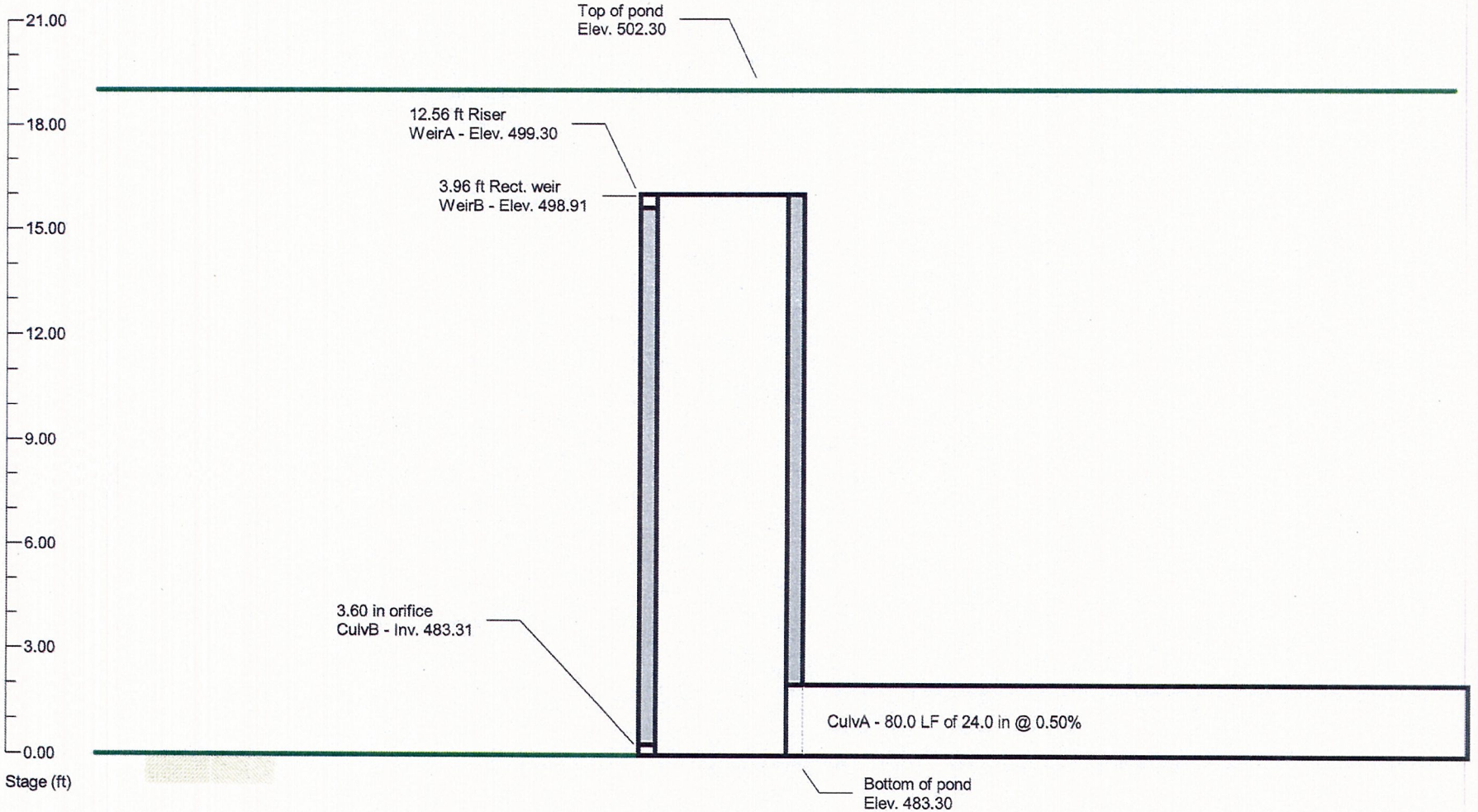
Hydrograph type	= Reservoir	Peak discharge	= 1.53 cfs
Storm frequency	= 100 yrs	Time interval	= 8 min
Inflow hyd. No.	= 1	Max. Elevation	= 498.96 ft
Reservoir name	= Basin B (S.E. corner)	Max. Storage	= 671,456 cuft

Storage Indication method used.

Hydrograph Volume = 688,896 cuft



Pond No. 2 - Basin B (S.E. corner)



Section
NTS

100-yr
50-yr
10-yr

Inflow hydrograph = 1. Manual - East Basin

6

SECTION 6

DRAINAGE EXHIBIT

LEGEND

PROPOSED GROUND CONTOURS
360

EXISTING GROUND CONTOURS
360 INDEX
360 INTERMEDIATE

DRAINAGE BASIN DESIGNATOR

A / 0.57 — BASIN DESIGNATION (ALPHA CHARACTERS DESIGNATE REGIONAL RUNOFF AREAS)

BASIN AREA (Acres)

DRAINAGE BASIN BOUNDARY

PROPERTY LINE

STORM DRAIN PIPE

STORM DRAIN CLEANOUT

STORM DRAIN CATCH BASIN

STORM DRAIN CURB INLET

PROPOSED STORM WATER COLLECTION BASIN & RISER

PROPOSED OPEN DRAINAGE CHANNEL

PROPOSED HEADWALL/ENERGY DISSIPATOR

PROPOSED BROW DITCH

0 100 200 400 600
SCALE: 1" = 200'

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SAN DIEGO, CALIFORNIA

EXHIBIT "A" PROPOSED CONDITION

DATE: 01/31/14
SCE NO. 12009.02
SHEET A
1 OF 1 SHEET

X:\2012\12009\CAD\REPORTS\DRN\12009 DRN B_PR.dwg 1/30/2014 12:51:17 PM PST